COAL AGE

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Most states in which coal mining is an important industry have a law sanctioning the employment of check weighmen at mines. Sometimes, the law is more specific and states that there *shall be* a check weighman at all mines.

A little investigation in these states will reveal the following facts:

1.—All camps that are unionized and in which the "cut out" is in vogue, have a check weighman.

2.—Most camps that are not unionized do not have the check weighmen.

From these facts it is easy to assume that the operators are opposed to check weighmen and, at the non-union camps, intimidate the men into relinquishing their statutory rights. In fact, this charge has been repeatedly made by Eastern writers, in commenting on the present strike in Colorado.

Judging by our investigations in other states, we feel confident that these charges will be found untrue.

In Alabama, for example, during the 1908 strike, the union officials continually made capital of the fact that most mines were without check weighmen, and that this condition of affairs was contrary to the state law. After the strike was called off, the large companies issued orders to all of their superintendents to call meetings and insist on the miners electing check weighmen for each tipple.

Strange to say (from the viewpoint of the public) the men took no interest in the matter, and at many camps, not only refused to elect weighmen, but insisted on being allowed to continue without them.

Why?

1.—They didn't want to be assessed with their pro rata share of the weighman's wages.

2.—They had absolute confidence in the company weighman.

Just consider a moment, if you please, the position of a company weighman. If dishonest, he has all the opportunity in the world to steal from the company, by making false entries and crediting the surplus to "dummies."

It naturally follows that it is to the company's interest to pick an honest weighman, and that when such a man is selected, the miners will get honest weights.

Do you wonder, then, that the men are willing to trust the company's representative?

In Tennessee, we know of a case where a superintendent of a small operation, wishing to relieve his miners of the expense of a check weighman and yet unwilling to merit their distrust, offered to allow his men to elect a weighman from their ranks, to serve in the dual capacity. They refused because they preferred to bank on the boss' judgment, for so important a post.

Are we asking for the elimination of the check weighman?

Certainly not.

However, the next time you hear a union official or a college professor making rash statements about intimidation, etc., just give him a chance to produce some facts.

Indiana's First Electrically Operated Coal Mine

By Wiley F. Corl*

SYNOPSIS—A power contract which is fair to all concerned, and modern equipment carefully installed, render it possible for this mine to produce coal with an expense for current of but slightly over 3c. per ton of output.

Mine No. 1 of the J. K. Dering Coal Co., at Clinton, Ind., is, so far as we know, the first mine in that state to be operated entirely by electricity. It is believed, therefore, that a description of this installation will be of interest to mining men.

Many papers have been writen, setting forth the advantages of operating coal mines electrically over other methods; it is therefore considered unnecessary to give a review of this subject, as we believe that any new mine which is likely to be developed at this time will be electrically operated, provided cheap current is available.

Many mining men are, however, still sceptical as to the advantages of electric operation, and advancement in this direction is due to the foresight and energy of such men as J. K. Dering, who are willing to take the lead in these matters.

Mine No. 1, formerly known as Oak Hill mine, has been in operation for a number of years in upper seams of coal, but for only about one year in the No. 3 seam, which is now being worked. When this mine was opened in the No. 3 seam, an entirely new equipment was provided, including a steel tipple of the well known A. & G. type, a view of which is shown in Fig. 6.

The new electrified mine was placed in operation on Jan. 19, 1914, and a record of the power consumption since that date is given later in this article. It should be noted that although the mine is at present working at about one-third of its capacity, the cost of power per ton of coal is extremely low. A general plan, showing the location of buildings and the wiring scheme, is shown in Fig. 8. The photograph, Fig. 2, is a view of the plant, showing particularly the high-tension outdoor switch and

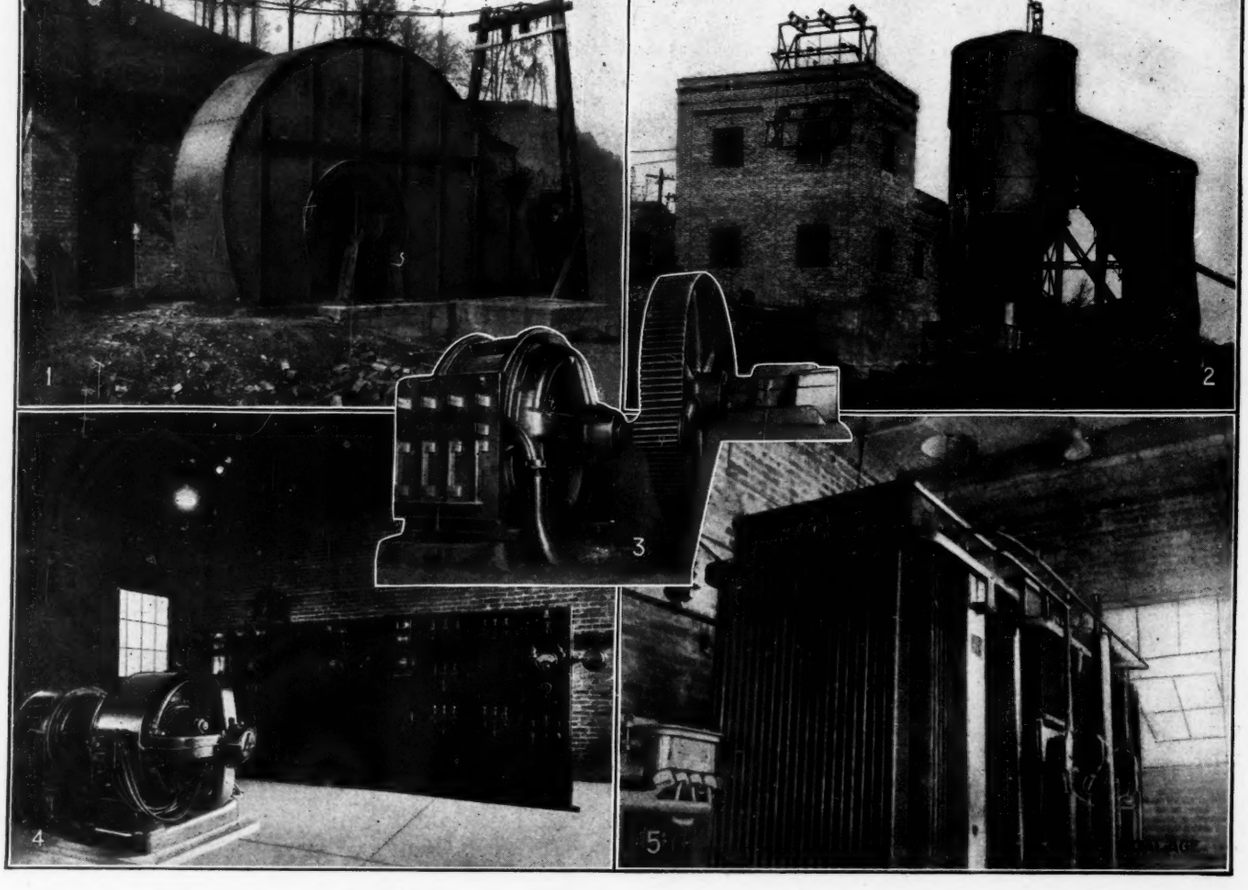

Fig. 1. Ventilating Fan
Fig. 2. Showing High-Tension Wiring
Fig. 3. Motor Driving Fan
Fig. 4. Motor-Generator Set
Fig. 5. Step-Down Transformers

*Electrical engineer, Allen and Garcia Co., Chicago.

FIG. 6. GENERAL VIEW OF TIPPLE AND SUBSTATION

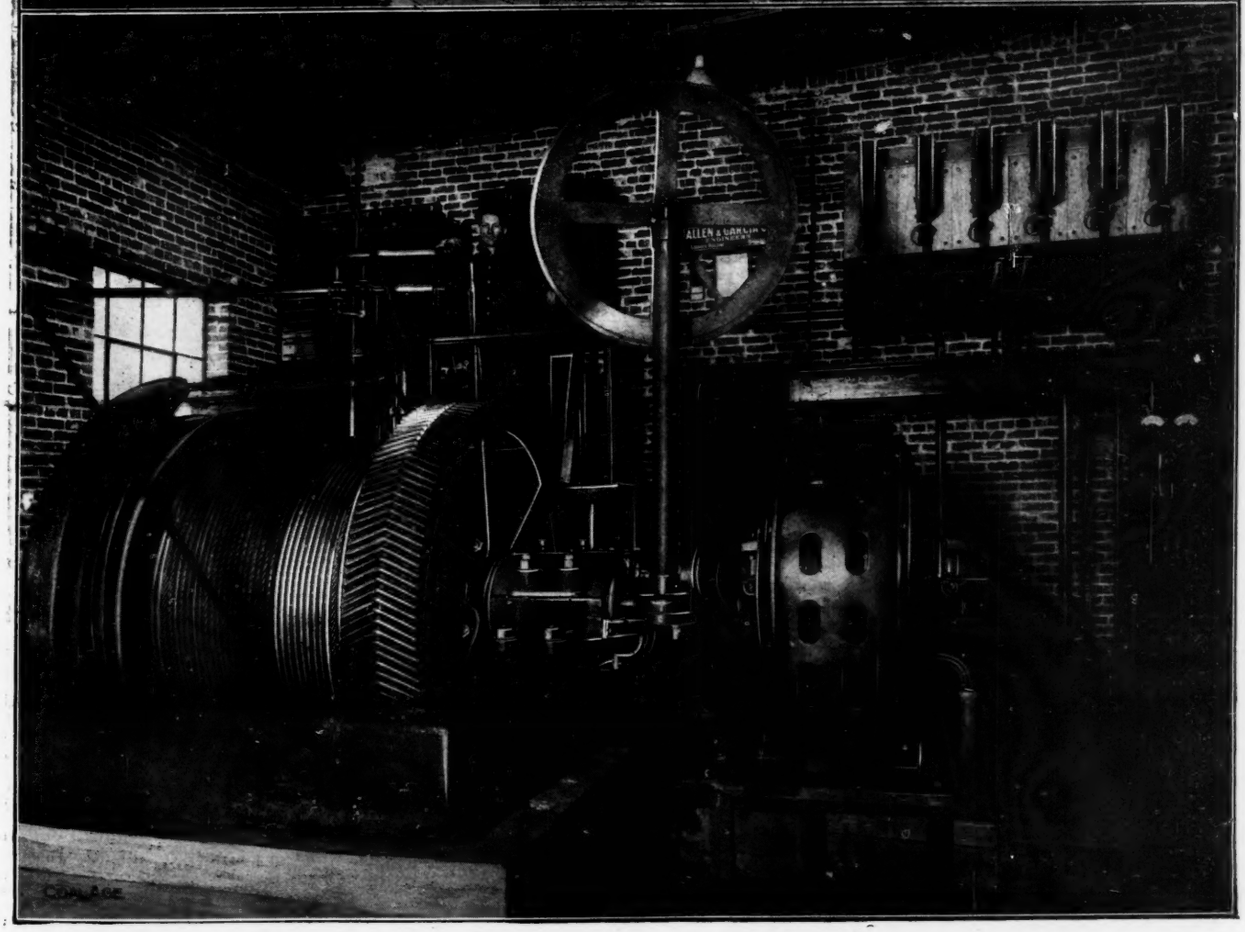

FIG. 7. THE ELECTRIC HOISTING ENGINE

the wires entering the building, the layout of the apparatus and the electric conduits are shown in Fig. 9.

Central Station Power Is Employed

Electric power is purchased from the Terre Haute, Indianapolis & Eastern Traction Co., and is brought to the mine at 22,000 volts, 3-phase, 60 cycles. It is then stepped down to 2200 volts by means of the transformers shown in Fig. 5.

The hoist motor and the motor-generator set are operated at 2200 volts, while all other motors take 220 volts, the power being taken from a small bank or secondary transformers.

Fig. 4 shows the motor-generator set and the switchboard controlling the different circuits. Extra panels are supplied to take care of additional motor-generator sets and additional 2200-volt and 220-volt circuits.

The electric hoist is shown in Fig. 7. This machine was furnished by the Ottumwa Iron Works. The drum is

The hoist motor is of the rotor-wound type and was designed to operate at a full speed of 514 r.p.m. This speed can be varied, however, in 7 steps and is controlled by a master drum, which operates solenoid switches and causes resistances to be cut into and out of each phase of the rotor circuit. This drum also reverses the direction of rotation of the motor at the will of the operator.

Double Precautions Against Overwinding

To guard against over-winding, a limit switch is geared to the hoist drum, so arranged as to shut off the current and apply the brakes after the latter has made a fixed number of revolutions. As an extra precaution switches are also placed on the tipple guides below the sheaves, so that the current will be cut off and the breaks applied in case the geared limit switch fails to act. In this connection it might be emphasized that the electric hoist can be made safer than a steam engine, and in fact can be better controlled in every way.

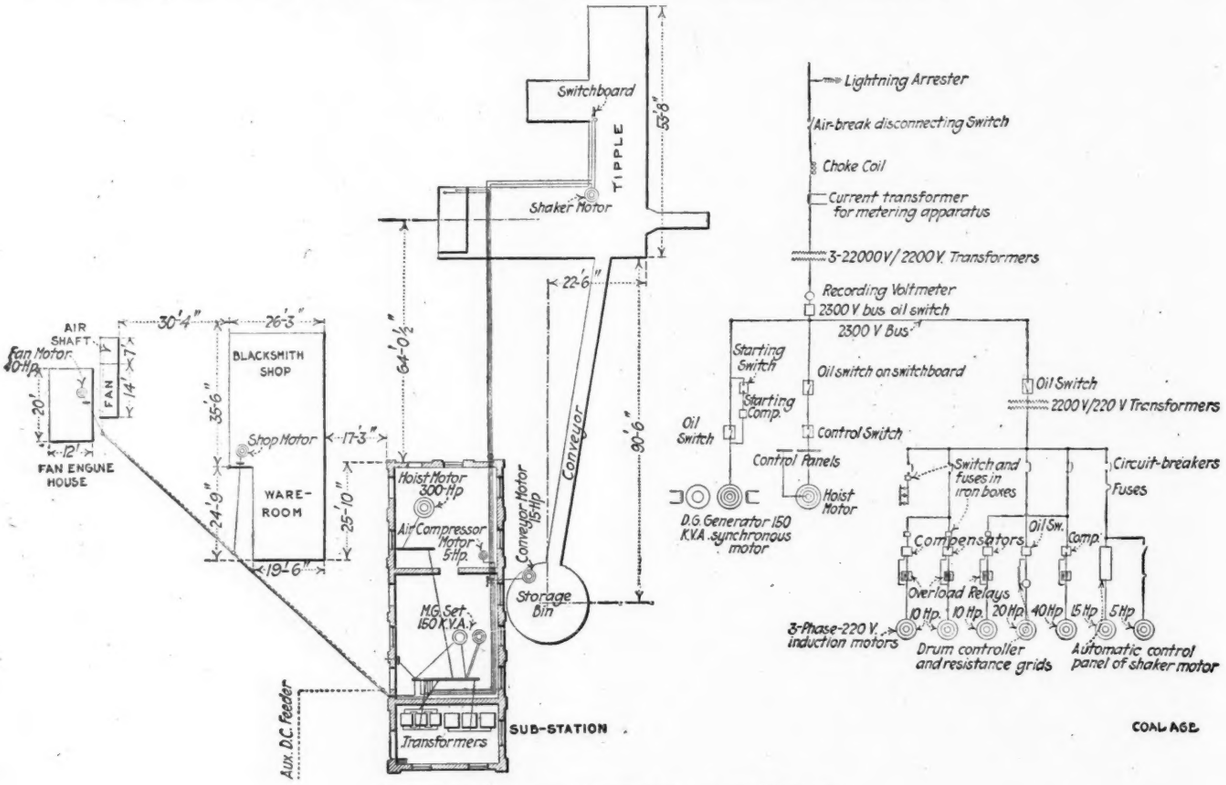

Fig. 8. Plan of Buildings and Wiring

5 ft. in diameter and is driven by means of herringbone gears from a 300-hp., 2200-volt motor. The brake is operated by a compressed-air engine of the air-oil type, which permits of close adjustment in braking. The air is supplied from an automatic, electrically-driven air compressor.

The capacity of the hoist is 306 tons per hour. The following table shows some of the information relative to its duty:

TABLE OF HOIST DUTY

Weight of cage	5000 lb.
Weight of car	1200 lb.
Weight of 1⅛-in. rope	550 lb.
Weight of coal	3400 lb.
Vertical lift of hoist	274 ft.
Time of acceleration	6 seconds
Time of constant running	7 seconds
Time of caging	3 seconds
Total time for one complete cycle	20 seconds

At present there is one 150-kw. synchronous motor-generator set which furnishes direct current at 250 volts for operating the pump and the cutting machines. The coal is undercut by Sullivan continuous cutters. An additional 300-kw. set will be installed immediately and electric locomotives will then be employed for hauling and gathering the coal. Electric power at 250 volts, direct current, will also be supplied from this installation to a neighboring mine for use in haulage and cutting.

An arrangement is also provided whereby power at 250 volts, direct current, can be returned from an engine-driven unit, at this neighboring mine and reverse the motor-generator set. In this way sufficient power is obtainable to operate the fan and to run the hoist at a low speed in case of failure of the transmission line from the central power station.

A new 8-ft. Jeffrey fan has been installed, as shown in Fig. 1. This machine is driven by a geared 40-20-hp. two-speed motor, as shown in Fig. 3. The fan requires at this time only about 10 hp. When the mine is further developed, however, it will consume about 40 hp., and it is then expected that the motor will be operated at full speed during the day time, and at half speed at night to save current. The shaking screen is operated by a 20-hp., variable-speed motor at 300 to 900 r.p.m. The control of this unit is in the weighman's house in the tipple.

The conveyor is operated by a 15-hp. constant-speed motor. This machine has an automatic-control arrangement, by which it can be started or stopped from the weighman's house also.

There are many forms of power contracts in use at the present time, several of which divide their charges into two parts; a primary charge, depending upon the maximum demand, and one based upon the current consumption. This latter item per kilowatt-hour varies with the amount of current used. This form of contract is based upon engineering facts and is best from a theoretical standpoint.

The main disadvantage of this type of agreement lies in the fact that it is hard to explain to the ordinary coal operator, who is not versed in electrical technique. It usually penalizes the small consumer since the average cost of energy is considerably higher to him than to one using a large quantity.

Of course, from an electrical standpoint the larger

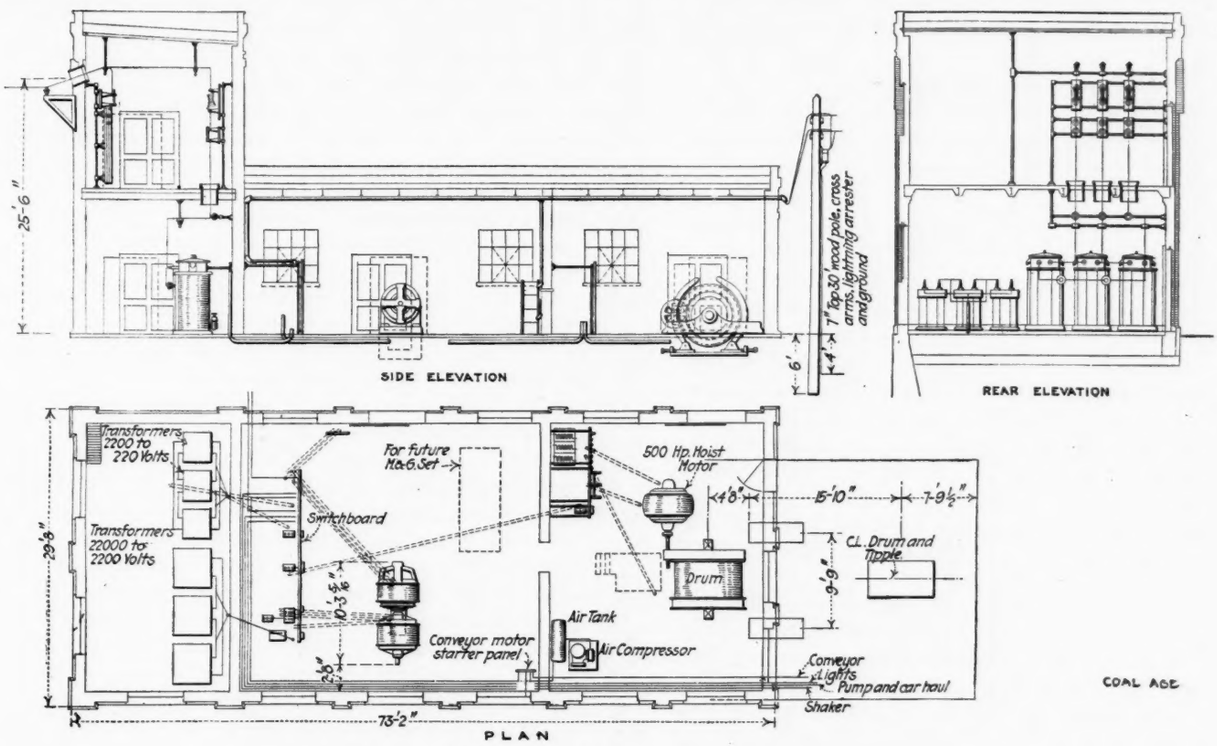

FIG. 9. LAYOUT OF APPARATUS AND CONDUITS

This mine does not make much water, and the pumping duty is light. A Deming triplex plunger pump is direct connected to a 5-hp. motor and is operated from the 250-volt, direct-current underground circuit.

A new brick building has been erected for shop work, in which the line shaft is driven by a 10-hp. constant-speed motor. The empty cars from the cage are taken up an incline by a car drag, actuated by a 10-hp. constant-speed motor. An electric switch, operated by the cager at the shaft, has been installed at the top of this car haul, so that the empty wagons can be sent to ether run-around. This witch saves a man who would otherwise be required.

COMMERCIAL ELECTRIFICATION DEPENDS ON COST

Almost everyone will agree that an electrified mine is more desirable than a steam operated plant, provided that the cost of installation and operation is no greater. Therefore, whether or not a development can be electrified depends upon the cost of current.

user is entitled to a somewhat lower rate. We do not intend to here discuss the merits of different rates, but only to say that from an operator's standpoint it appears best when possible to purchase electrical energy on a metered-current basis (with a sliding scale), although provision should rightly be made to cover a minimum bill.

THE CONTRACT IS FAIR BOTH WAYS

The Terre Haute, Indianapolis & Eastern Traction Co.'s rate is a very fair one for both the operator and the power company. The basis of this rate is a metered-current charge (with a sliding scale), while the power company is guaranteed a minimum bill, based upon a charge of $1 per month per kilowatt of maximum demand, this demand being assumed to be two-thirds of the connected load (manufacturers' rating).

Normally the energy consumed on the metered-current basis is greater than the maximum demand charges, in which case the minimum charge is absorbed.

The rates on the metered-current charge are as follows:

	Cents per Kw.-Hr.
For the first 5000 kw.-hr	1.75
For the second 5000 kw.-hr	1.6
For the next 40,000 kw-hr	1.5
All current in excess of the above	1.35

The energy is metered on the 2200-volt side of the transformers and the bills are subject to a discount of 10 per cent., provided they are paid within 10 days after presentation. Several provisions are inserted in the contract to protect the power company, as well as the coal company, in case of difficulties in operation.

During the month of March, 1914, the mine worked 25 days at an average of nearly 600 tons per day, making a total production of 14,520 tons. The current consumption during this month, including the idle days, was 33,000 kw.-hr., or 2.27 kw.-hr. per ton of coal. This includes all operations except hauling.

This current consumption is divided into the following parts:

For hoisting 1.26 kw.-hr. per ton of coal.
For all miscellaneous motors, 0.295 kw.-hr. per ton of coal.
For cutting and pumping 0.715 kw.-hr. per ton of coal.

The consumption for cutting and pumping is taken on the alternating-current side of the motor-generator set.

All Power Used Is Included in Test

The above record of power consumption includes everything required, idle days as well as working days. On a test the hoist motor takes only 0.6 kw.-hr. per ton of coal per hoist, but this figure is increased even on working days to about 1 kw.-hr., this being partly because the coal is not dumped in one motion, but is "inched" or gradually discharged for better screening. Also many extra hoists are made to take the men, mules and material up and down. When hoists are made at the rate of 3 per minute, it is necessary to reverse or "plug" the motor for quick retarding. This internal electric braking requires about ¼ kw.-hr.

It is expected that when the mine reaches its normal output of 2400 tons per day, the current consumption per ton of coal for all operations, including standby losses and idle days, will be less than 2 kw.-hr.

The power bill for the month of March was $460, which is equal to a charge of approximately 1.4c. per kw.-hr., or slightly over 3c. per ton of coal.

All the engineering work in connection with the design, purchase and installation of this plant was performed by the Allen & Garcia Co., consulting and constructing engineers, of Chicago. The entire electrical equipment was furnished by the General Electric Co., except that the Westinghouse Electric & Mfg. Co. supplied the high-tension transformers, and the Delta Star Electric Co. provided the outdoor switching and protective apparatus.

Robert Nelson, the Electrical Inspector of Mines in Great Britain, says the practical requirements for safety in working an electrical plant underground are: (1) Strong metallic outer coverings for all apparatus (a) to protect insulating material from abrasion, (b) to prevent accidental contact by persons with live parts, and (c) to prevent open sparking. (2) An efficient connection to earth for the metallic outer coverings above mentioned. (3) Provision for making a faulty circuit dead automatically immediately leakage of current begins to develop. (1) and (2) can as readily be provided for in continuous-current working as in 3-phase working. (3) can be more conveniently provided for in 3-phase working.

Extracts from a Superintendent's Diary

Today we broke the company record for tons of coal hoisted from a single track slope in one shift. Am I proud? I am! Am I elated? I am not! The tension has been relieved and I am thinking of what is to follow. Tomorrow every superintendent in the company's employ will receive a slip of paper containing my record, and, along with that slip of paper, although invisible to the unintiated, goes a command to do just a bit better.

That's according to the "speeding-up" system. "Just a little better." So much depends upon that. How can you expect an increase in salary if someone is doing better? How can you ask for more assistants if someone is doing better? How can you ask for new expenditures if someone is doing better? How can you explain anything satisfactorily if someone is doing better?

But one can't be best always. In a short time—possibly in a very short time—someone will beat my record, and, presto, change! I will find myself again with the rear guard, submitting to the prodding of the big boss.

Let me hasten to explain that the big boss isn't half as terrible as I'm trying to picture him. He worked up through the ranks, so he knows how to handle us. He wants to stay where he is, so he's compelled to allow the biggest boss to handle him.

And how about the very biggest boss? Oh, there are unsatisfactory yearly statements and directors' meetings to hold his attention most of the time, and sometimes he probably gets a bit nervous himself.

Last week, at our regular monthly meeting of all the company superintendents, the boss kept his eyes pretty constantly on my corner of the room whenever records were discussed, and such partiality, properly interpreted, is always a reminder that the favored one hasn't been at the head of the record list for some time. It is therefore deemed advisable to indicate that a little extra ginger might be appreciated. This extra ginger has cost me some sleep during the week, but it resulted in today's record. At the next meeting it is likely I won't be noticed. Who will? Probably Tim Daily, and the old man can't stand much more of this close inspection.

These old men who are close to the 65 mark get flustered easily, and, if they once lose their nerve, the jig is up for all time.

Then there is another unfortunate combination of circumstances to affect the old man. Two of the assistant superintendents have been offered jobs as superintendents by other companies, and the boss is sounding carefully before consenting to lose them. Daily realizes this and, in consequence, is already nervous.

And only three years has passed since Daily broke the best previous record and held it for six months.

We were discussing it last week. "Tom," said the old man, putting his hand on my shoulder (I'm still Tom to him, just as I was ten years ago, when he gave me my first job as rodman on his crew) "Tom, three other companies tried to get me then, but I refused to be tempted; and you can't guess why. No, it wasn't company loyalty. It was the fear of losing my right to an old-age pension. In one more year she'll be mine, Tom. It's all that can save the old man now." Records, ginger, old-age pensions, and possible rivals—all to think of at one time. Do you wonder old men drop off suddenly sometimes?

Effect of Panama Canal on World's Coal Markets--III

By F. R. Wadleigh.*

SYNOPSIS—This is the third and concluding article discussing ex-Gov. MacCorkle's paper on this subject. This installment deals largely with the competition West Virginia may expect among the other domestic coals. Pennsylvania, Virginia and Alabama will all bid aggressively for the export business. In conclusion Mr. Wadleigh believes American shippers should devote greater attention to the possibilities of briquetting for the export trade.

In the state of Washington there are only three important producing coal counties, and the 1913 production was 3,823,000 tons, the average *price* at the mines in 1912 being $2.39.

As regards the quality of the Washington fuels, the article says: "Forty-nine determinations which are representative of this state show an average of 10,923 B.t.u.," and further, "Ninety-eight determinations of New River coal show an average heating value of 15,232 B.t.u."

The forty-nine determinations of Washington fuel mentioned are for coal as received, while the New River determinations are on dry coal, which is an obviously unfair comparison.

Of the Washington coals, 26 mine samples, dry coal, from the best fields show an average of 12,961 B.t.u. (Bulletin 22, Bureau of Mines.) The average of 116 mine samples from 42 mines in the New River field shows an average of 15,006 B.t.u. dry coal. This is rather a different story and a more accurate comparison.

After giving the average "price" at the mines of Washington coal as $2.39 per net ton and the average "value" of the New River-Pocahontas as a "fraction under $1 per ton," the author deduces that the actual *cost* of the latter coals at Hampton Roads ($1.40 freight plus $1 at mines) is practically the same as the *cost* of the Washington coals at the mines. Here is a confusion of terms between the cost of production and price received. The $2.39 figure for Washington coal is the *price received,* and their actual cost of production is not over $1.50 per ton.

We agree with Mr. MacCorkle, however, that the Washington product will not be a strong competitor with the West Virginia coals along the South Pacific coasts below San Francisco, as the British Columbia fuels are already gaining tonnage over the Washington, while oil is making still further inroads on their markets.

"Alabama Fields Cannot Compete"

The article says: "The expectation of Alabama is to get its coals to Mobile by self-propelling barges."

This is not only an expectation, but an accomplished fact. But the coals are also going to New Orleans, this being the principal tidewater market for Alabama fuels.

The following figures are given in the article to show that Alabama "can never become an enormous competitor with West Virginia in this field":

		Alabama	West Virginia
Production	1912	16,100,600 tons	66,786,687 tons
Value at mines..	1912	$1.29 per ton	$0.94 per ton

Alabama used 4,585,498 tons of coal in its coke ovens, or 28 per cent. of its entire production.

This is hardly a fair comparison as regards prices because:

First—The average *price* at the mines was $1.27 for Alabama coal, not $1.29.

Second—1912 was a low-price year in West Virginia, but not in Alabama.

Third—The lower-priced and inferior coals of West Virginia should not be considered in this connection; the average value at the mines of coal from the New River-Pocahontas area was 98 cents.

The figures from the 1909 Census returns showing a production cost of $1.12 per ton in Alabama and 83½c. in West Virginia are of no value today.

It is further stated in this connection: "Our New River and Pocahontas coals have far greater heating values than those of Alabama."

The average B.t.u. value of the different coals is as follows:

Coal	Samples	Mines	B.t.u.
Pocahontas	205	64	15 008
New River	116	42	15,006
Alabama	43	35	14,266
Pratt, Black Creek and Blue Creek.. ...		9	14,883

As to prices, the article says: "New River and Pocahontas coals can be delivered at Hampton Roads at a lower price than Alabama can quote at either Mobile or New Orleans."

The present price of Alabama coals at New Orleans is $3.25 per ton trimmed into ship's bunkers, while the price of New River coal is $2.85 f.o.b. ship, not trimmed. When the water rate on Alabama coal is adjusted and settled, the above price will be cut considerably.

As to distances it is stated: "The sailing distance from Hampton Roads to Colon is 1778 miles, and from Mobile (or New Orleans) is 1376 miles. This relatively small inequality in distance makes practically no difference in the rate to the Panama Canal."

This "relatively small inequality" is 23%, quite enough, we would say, to make a very practical difference in rates, as it actually does.

Quoting Mr. MacCorkle:

"New York City Too Valuable a Port for Coal Shipment"

Under this caption the article states:

"Let us consider briefly our competition with Pennsylvania for this export trade. The ocean port at which Pennsylvania coals are loaded is New York harbor."

Then follows some reasons why New York cannot handle much export trade, crowded harbor, access to her shores over *a crowded and congested railroad* (is this the Pennsylvania or the New York Central or the Baltimore & Ohio?), lack of loading facilities, etc.

As a matter of fact, no coal is loaded for export in New York Harbor. Foreign ships take about 4 million tons per year (the figures for 1912 being 3,949,000 tons), but solely for ships' consumption. West Virginia coal

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cannot compete in this trade under present freight rates.

As regards Philadelphia the article says:

"Philadelphia, by reason of its natural situation, will not participate largely in the export business."

There is nothing in the natural situation of Philadelphia to prevent its participating, and, as a matter of fact, it is a large and increasing factor, the exports for 1913 being 939,900 tons, as compared with 791,500 tons in 1911. For comparison we give the following export figures for 1913, which show Philadelphia's importance in this trade:

Lamberts Point	Hampton Roads	1,284,189
Sewalls Point		307,794
Newport News		838,720
Philadelphia		939,900
Baltimore		870,750

If we deduct from the Hampton Roads exports the 475,317 tons shipped to the Panama Canal, which is for use in the canal work and not really export coal, this leaves only 1,965,387. It thus appears that Philadelphia actually exported more coal than any other port in the United States, if Sewalls Point and Lamberts Point be taken separately.

But it is said further: "In fact, Pennsylvania as a whole, by reason of her enormous and increasing consuming ability, will be less and less a competitor in the more distant export trade. She is devoting her energies largely to her great trade at the Lakes, Canada and New England."

While her consuming ability increases, so does her output. Why should she devote her energies to the Lakes, Canada and New England if she expects to consume all her coal at home? The above markets are just as much outside as are the foreign markets. Pennsylvania output of bituminous coal increased 12 per cent. in 1912 over 1911, and 10 per cent. in 1913 over 1912. Two counties alone produced about as much coal as the whole of West Virginia.

On the question of competition between Pennsylvania and West Virginia the article states: "While our coals are the equals of those of Pennsylvania, West Virginia does not compete in the Eastern markets with that state, except on water-borne coals to Providence, Boston and Portland."

This is not an accurate statement of the case. West Virginia coals compete with Pennsylvania in and around Philadelphia, New York, along the South Atlantic coast and in New England, both against water-borne coals shipped from Philadelphia and New York and all-rail coal from Pennsylvania mines.

Maryland and Virginia Coals

It is stated: "Our Fairmount region is farther away, but is shipping West Virginia coal into Baltimore in competition with that of Maryland." Fairmount coal is entirely different from that of Maryland and can hardly be called competitive. The Big Vein Georges Creek coal of Maryland is *one* of the best smithing coals, but it is also a very excellent steam coal, is used as such by the U. S. Navy and is preferred by many to either New River or Pocahontas for making steam.

Although Mr. MacCorkle mentions the possible competition of Virginia coals, he fails to discuss this point. Evidently he is not familiar with the Clinchfield coals and the aggressive efforts its owners are making to enter the export trade. The Clinchfield company is building a most efficient and modern coaling plant at Charleston, S. C., having a large storage capacity, and has already entered the Galveston and Gulf markets.

True, this coal is not quite equal to New River in heating value, but it will be sold more cheaply; it has the best and most uniform car supply of any group of mines in the country and an aggressive sales organization. The West Virginian operators cannot afford to ignore its competition, as it has already driven them out of some domestic markets. The Stonega Coal Company is also arranging to enter the Tidewater markets. This is an excellent coal, better even than the Clinchfield.

"How Canals Will Help West Virginia"

Mr. MacCorkle says that at Calvin Creek, the head of navigation on the Kanawha River, coal can be placed on barges at $1.15 per ton, and that such coal can be transported to New Orleans at $1.25 to $1.50 per ton. We presume that this is the actual cost and includes no profit (it certainly cannot include any on the coal), but does include all fixed charges, interest, depreciation and insurance; it does not include cost of transferring the coal to ships.

This makes the cost of coal on barges at New Orleans $2.65; to get this coal to Colon it must be transferred to ships, which will add at least 25c. per ton or a total or $2.90, f.o.b. ship New Orleans. Then the freight to Colon is given as $1 per ton, or a total cost at Colon of $3.90.

Admitting the correctness of these figures this still fails to show any advantage, as will be noted in the following:

Via Hampton Roads		Via New Orleans	
Cost of coal at mines..	$0.90	Cost on barges.....	$1.15
Freight, rail	1.40	River freight.....	1.50
Trimming, etc.....	0.10	Transfer to ship.....	0.25
Ocean freight c.i.f. Colon	1.395	Ocean freight c.i.f. Colon	1.00
Total	$3.795	Total	$3.90

And, if the freight from Hampton Roads to Colon can be cut to 90c. per ton, as estimated by the government, then the Hampton Roads route would be only $3.30 as against $3.90. Even with the present quoted price at Hampton Roads, $2.85 plus 10c. trimming, etc., Hampton Roads coal would still have a slight advantage.

Mr. MacCorkle then goes on to say that the great objection to this method of transportation is the difficulty of transferring coal from barges to ships, and that the United States Government, after careful investigation, proposes the building of 500, 1000-ton steel seagoing barges that can be towed on the Gulf and Carribean Sea. Under these conditions, Mr. MacCorkle estimates that West Virginia coal costing $1 or less at the mines could be shipped "anywhere to the coasts of North or South America and sold for $3 or less per ton." By the coasts of North or South America we presume is meant within the Gulf and Carribean Sea, although it is not so stated. How much profit would there be in $3 per ton at Colon?

In speaking of the New River-Pocahontas coals in the article they are called "smokeless" coals. It seems about time that we should stop the use of this misleading and incorrect description. These coals are not smokeless, except when burned under proper combustion conditions. Illinois coals with 35 per cent. volatile can also be burned without smoke. They make less smoke under any conditions than higher volatile coals, but, on the other hand, they make more smoke than the best Welsh fuels, and

there is plenty of Pennsylvania coal that has just as much right to be called "smokeless"; in fact, more so than any New River coal.

The proper term for these coals when they are to be described in "smoke terms" is "low volatile." The coals from the No. 1 or Eagle and the No. 2 or Gas seams of West Virginia are called "semi-smokeless" fuels, and, with the New River and Pocahontas, it is said, "will be the fuels which will be used at the canal." Coals containing from 27 to 35 per cent. volatile, as do the Eagle and No. 2 Gas coals, can hardly be termed even "semi-smokeless." They will never be used at the canal, because they are lower in heating value and not as good steamship coal as the New River-Pocahontas, in addition to which they are much more "smoky."

The proper field for the Eagle coal is in making by-product coke, for which purpose it is the best coal in this country when used unmixed. The No. 2 Gas coal has its field as a locomotive fuel, in making gas, for general steam use in nearby territory where the freight rates are in its favor, and in mechanical stokers. It is also extremely doubtful if the Kanawha splint coals are, as stated, "well suited for gas making."

Briquetting West Virginia Coals

There is another branch of the South American export coal trade that Mr. MacCorkle does not touch upon, probably because the West Virginia coal interests have never looked into it sufficiently. This is the making of briquettes. While the use of briquettes in the South is small, compared with that of raw coal, it is well worth looking into. In 1912, for instance, 453,000 tons of briquettes were shipped from South Wales to South America, Central America and Mexico, including:

	Tons
Peru	23,500
Chile	138,823
Argentine	33,300
Brazil	209,300
Uruaguay	7,700
Venezuela	16,700
Guiana	3,100
Costa Rica	4,500
Total	436,923

The establishing of a briquetting plant for New River-Pocahontas coals, either at tidewater or, preferably, at the port of consumption, such as Rio Janeiro, would enable briquettes from these coals to compete on favorable terms with those from South Wales. The cost of such a plant of 300 tons daily capacity would be about $100,000 at Hampton Roads.

The cost of briquetting at Rio would be approximately $1.20, which, with coal at $6.25, would make the total $7.45. The c.i.f. cost of South Wales briquettes at Rio today is about $8.26, the cost f.o.b. Cardiff being $5.10. To this must be added the cost of discharging, about 50c., making a total of $8.76.

As to quality, briquettes from New River-Pocahontas are superior in heating value, and just as good structurally and mechanically. The following is a comparative analysis:

	New River	Pocahontas	Cardiff "Star"	Cardiff "Crown"	Swansea
Fixed carbon	72.74	76.13	72.44	74.48	72.73
Moisture	2.70	1.06	0.80	1.46	2.70
Volatile	20.26	17.30	17.86	16.35	16.13
Ash	4.28	5.51	8.90	7.71	8.44
Sulphur	0.81	0.65	0.81	0.91	1.07
B.t.u.	14,886	14,836	13,446	13,499	13,241

These analyses of New River-Pocahontas coals were made from samples taken by the U. S. Geological Survey in 1907, briquettes made from run-of-mine coal. The Welsh analyses were from samples of actual shipments, the briquettes made from dock screenings and slack.

For making briquettes at Rio Janeiro or other unloading ports, sufficient screenings could be taken out of the run-of-mine coal, which would solve, to some extent, the problem of getting more lumpy coal for steam users.

This whole question of our coal exports and their possible increase is so important to the operators, shippers and allied interests that we should be careful to have full, reliable and accurate information. We should go into this matter with open minds, ready for any suggestions, willing to make use of the experience of our competitors, working out our method of operation on a systematic basis and investigating carefully each point. Our efforts should be continuous and not spasmodic, as they have been in the past.

Celebrating the Fourth in the West Virginia Camps

The Fourth of July was celebrated in the mining camps of the southern half of West Virginia on the most elaborate scale those camps have ever seen. Instead of being isolated places on Independence Day, as is generally the case, they were centers of gayety and the larger towns near them were deserted.

As a result of several weeks' planning the celebration began early in the morning and folk from the farms and the various country towns assembled in the mining camps. They made merry from sun-up until late in the night, as the guests of the coal operators and miners. Heretofore it has been the custom all over West Virginia for the railroads to run excursions from the mining camps to the towns in the several parts of the State. This year the process was reversed. Excursions were run from the county seats and the large towns along the lines to the mountain villages.

The celebration, in every instance, was in charge of committees composed of operators and miners, equally represented. In some communities several mining operations joined forces and the committees of arrangement were composed of employers and of employees from each of the participating mines.

West Virginia miners and operators decided to go back to the days of the fathers in the manner of observing the day. There was no work in the mines. The fun began early in the morning with the arrival of the farmers and their families with well filled baskets. These baskets were put on the tables with those brought by the families of operators and miners, and when the time came to feast, all lunched together.

After the arrival of the farmers with their teams and the people from the towns on the excursion trains, the celebration began with the reading of the Declaration of Independence and everybody sang "My Country 'Tis of Thee." Just as in the long ago, there was the Fourth of July oration. Every place of observance has procured some speaker of note. Young lawyers, middle-aged and old statesmen and politicians of all shades of political opinion told of the heroic deeds of the "boys of 1776" and of the greatness of this country. After the speeches the bands played "The Star Spangled Banner" and the lunch baskets were attacked.

In the afternoon there were baseball games, athletic contests and music by the bands. The operators and the miners joined in contributing to a fund sufficient to give everybody at least two "pokes" of ice cream.

The celebration ended with the fireworks at night. Hundreds of dollars were spent at each place for these fireworks and experts were on hand to set them off. At one place, where the mountains entirely surround the camp, men were stationed on the tops of the hills and at a given signal they blazed out three miles of red, white and blue light, while the miners, operators, farmer folk and townspeople stood bare-headed and the band played the national anthem.

In thin seams, even where the coal is cut by hand, a conveyor reduces the loading cost considerably, because the miner is saved the labor of double shoveling the coal to the car.

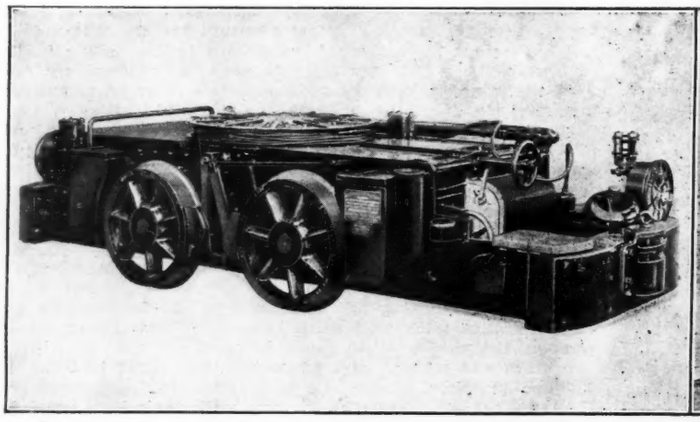
Electricity in Coal Mining

By David R. Shearer*

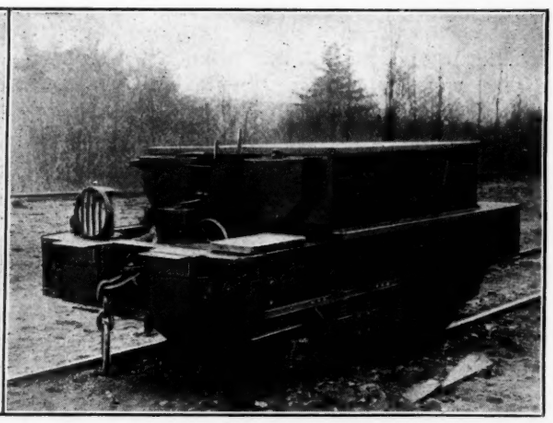
SYNOPSIS—This is the sixth article of the series on this subject. The essential differences in the various types of motors, series, shunt and compound wound, induction and synchronous are explained, as well as the distinctions between various types of locomotives ordinarily used in coal mining.

A motor is essentially a machine for changing electrical energy into mechanical power and is used at points where this power is needed for driving machinery. Two classes of motors are in common use, those used on alternating current and those used on direct. Each of these classes is then further subdivided into a great many types, each type having operating characteristics peculiar to itself and each suitable to certain kinds of work.

Considering the direct-current motor first, we find three types in use, the series, shunt and compound wound. The chief characteristics of the series motor are that it has a large starting torque, is easily controlled in speed by resistances and varies in speed almost in direct proportion to the load. For these reasons, series motors are nearly always used on mine locomotives, hoists and other machinery operating at various speeds.



A Gathering Locomotive



A Storage-Battery Locomotive

The shunt motor operates at very nearly the constant speed for which it is wound. The speed, however, drops to some extent upon the application of a heavy load but usually only a small percentage of the normal rating. Shunt motors are suitable for the operation of many types of machines, fans, pumps and other mechanical equipment not requiring a great variation in speed.

Compound motors, especially when equipped with interpoles, are used probably more than any other kind. The characteristics of this motor lie between those of the series- and the shunt-wound machines. They have the advantage over the shunt motor in that they start with a higher torque and are capable of assuming greater overloads. Such motors are suitable for operating practically every kind of machinery except that which requires great variations in speed, although some types of variable-speed compound motors are on the market.

*Knoxville, Tenn.

The real difference in these three types of motors is found in the field windings. In the series motor, the entire line current passes through the field and then through the armature, thus, when heavily loaded, the field is much stronger than when lightly loaded, the strength of the field varying in proportion to the line current. In the shunt motor, the field takes a definite amount of current continually, this amount depending not on the motor load but on the line voltage. Since the line voltage drops slightly, when the motor is heavily loaded, the field is to some extent weakened.

As a constant field tends to produce a constant speed, we secure a close regulation. If we weaken the field of a motor, the speed increases, and if we strengthen it the speed decreases. Thus a series motor without a load may run away and destroy the winding since the field is very weak when the motor is doing no work. The compound motor has both a series and shunt field and thus partakes of the nature of both of the preceding types.

Interpoles Are Now Frequently Used

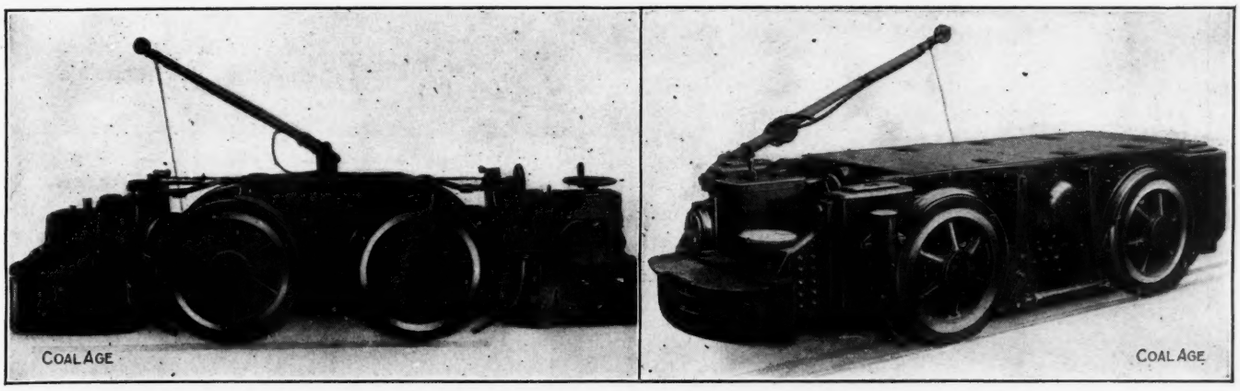
Within the last few years an additional winding on the field of a motor has come into extensive use. This is called the interpole winding and is placed on auxiliary poles located midway between the main poles. The chief use of these additional poles is in reducing the sparking at the commutator.

In alternating-current motor practice, we have two general classes, single phase and polyphase. Although single-phase motors are used to some extent, the operating characteristics are not very satisfactory, owing to the difficulty of bringing the machine up to speed. The polyphase motor, however, and especially the three phase, is quite satisfactory in operation and rugged in construction. Three general types of the polyphase motor are in use, the squirrel-cage induction motor, wound-rotor induction motor and synchronous motor.

The squirrel-cage motor is similar in operating characteristics to the shunt motor, but has the advantage that no open contacts, brushes or commutator are used. Taking everything into consideration, this is probably the

most rugged motor now used, the chief disadvantage now being that the speed is not easily varied except by a rather complicated method of changing the number of poles in the stator.

The wound-rotor motor is used almost exclusively where speed variations are necessary. As regularly momentary overloads and 25 per cent. overload continuously without overheating. Ordinarily, the temperature rating of motors is considered 40 deg. C. (104 deg. F.) above the surrounding air when operating fully loaded and 55 deg. C. (131 deg. F.) under 25 per cent. overload.



TWO TYPES OF TROLLEY LOCOMOTIVES

equipped, a speed variation of 50 per cent. is possible by introducing a variable resistance in the rotor circuit. This motor, however, has open contacts as the windings on the rotor are energized through three set of brushes running on slip rings.

The synchronous motor is rarely used except in large units, as the starting torque is very low without a special induction winding for starting duty. When the machine is brought up to speed, however, it keeps in exact step with the generator supplying the current. Probably the greatest use for these motors is in substation work, where a synchronous motor is direct-connected with a continuous-current generator. Synchronous motors are often used for power-factor correction, since from the nature of the machine, when running with over-excited fields, it produces a leading current and thus counteracts the lagging current found on a supply system loaded with induction motors.

DIRECT CONNECTION MAY OFTEN BE MADE

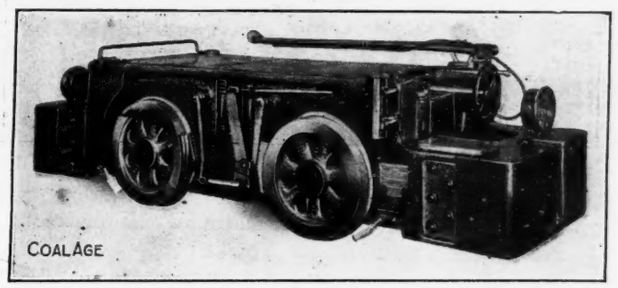
In the use of electric motors for mine service in connection with the various machines, found in such an operation, the characteristics of both alternating- and direct-current motors are such that in many cases they can be driect-connected or geared to the driven shaft in this manner, eliminating to a large extent friction losses and the first cost and upkeep of belts and countershafts. It is also possible to use a motor with each individual machine, obviating almost entirely line shafting and hangers.

This use of individual drive tends to increase the efficiency of a mining operation because no machines or shafts need be run except those actually in use. In the older methods, when operating by the use of the steam engine, the greater portion of shafting and belting was running continuously, thus increasing friction losses by an appreciable amount. In operating crushers, the momentum of the rotating part in a motor adds a flywheel effect which is perhaps of some advantage over a belted connection from a line shaft.

Practically all motors for use on both direct and alternating current are capable of carrying extremely heavy

Another advantage obtained in the use of individual motors is the ease with which power measurements may be made, for since each motor and the machine which it is driving forms a unit, instruments may be connected temporarily in the lines and actual power measurements of the machine load taken. This is of great advantage in that a machine may be worked at its full rated output and at maximum economy. This measurement also forms a check upon the operation of the motor, showing when it is overloaded or in need of repairs.

Still another advantage is in regard to peaks or overloads occurring at different points in the plant. The peaks rarely ever come on several machines at the same time, thus the electrical wiring system is in a sense dis-



A STRAIGHT HAULAGE LOCOMOTIVE

tributive, supplying excess current immediately to those points which are overloaded. Any one of the motor units may be shut down temporarily for adjustments or repairs or even moved to another location with absolutely negligible effects on the remainder of the system.

The ease of connection, flexibility and lightness in weight of electrical motors renders possible the use of portable machines and changes as to location or arrangement of machines in use may be made without interfering with the operation of the remainder of the equipment.

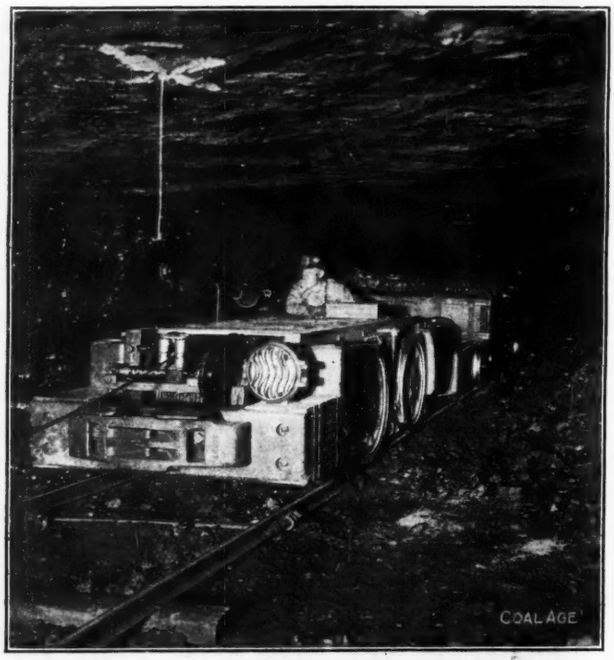
THERE IS A TENDENCY TOWARD STANDARDIZATION

The tendency in electrical-power applications to the use of coal mines is toward standardization, either in the

use of direct current throughout or by using synchronous or induction motors for work on the surface and direct current supplied by rotary converters or motor-generator sets for mine haulage.

In the use of a suitable power for mine haulage, the advantages and superiority of electric locomotives is generally conceded. This is due to the fact that an electric locomotive may be small in size, compact, simple of control, highly efficient and of great mechanical strength. Although compressed-air locomotives have been used to some extent, their efficiency is very low and at best they are cumbersome and require frequent charging from air lines laid in the mines.

Steam locomotives are almost entirely ruled out of mine work, owing to the large space required for their use and a smoke and fire hazard. Gasoline locomotives, too, have been used with some success, but are sometimes difficult to start, not able to withstand heavy overloads,



A Crab Locomotive at Work

they are expensive to maintain and have a lower tractive effort than an electric locomotive of corresponding size.

The life of a trolley-type electric locomotive is long. One is known which has been in use almost constantly for twenty-two years. No doubt, any other type of haulage motor would have been in the scrap pile after ten years' use.

Electric locomotives secure current for their operation by two methods. In one, the most commonly used, a trolley wire is carried on insulating supports into the mine above and alongside of the track. This forms one line of the electric circuit, while the rails upon which the locomotive runs form the other. Another type of locomotive secures current from a storage battery carried on the frame of the machine, which is charged at regular intervals from a direct-current supply.

There Are Three General Types of Trolley Locomotives

Three general forms of trolley-type electric locomotives are now in use, the straight haulage, cable reel or gathering and a combination or crab type. The standard weight ranges from two to 30 tons and some of the smaller sizes do not exceed 28 in. in total height. The straight haulage type is of undoubted value in hauling cars to the shaft or tipple in a mine having reasonably long haulage. This type is in use in practically all mines where electric service is available. For this service, the use of mules has practically been discarded, since one locomotive can deliver considerably more tonnage than several animals, can move faster, enter lower tunnels and, if necessary, operate continuously.

Gathering locomotives are very similar to the straight haulage machines, but in addition have a rotating reel operated by a small auxiliary motor, which carries a long length of electric cable, so that a locomotive of this type is able to go into cross-entries where there is no trolley line and be fed by current supplied through this cable, which it reels off on the ground when leaving the trolley line and winds up as it returns to the main track. The operation of this reel is entirely automatic, so that the driver may give his entire attention to the operation of the main or driving motor.

The crab-type locomotive is similar to the haulage machine, but with the addition of a hoisting drum operated by a strong compact series motor. A locomotive of this type may be blocked in an entry and by means of the hoist rope draw the loaded cars up the slopes and deliver them on the main haulage track. A few locomotives have been equipped with both the hoisting drum and cable reel, so that they may be used for practically every service required in haulage operation. Locomotives of these three types are shown in the accompanying illustrations.

In the operation of mines located a considerable distance from the tipple or breaker, it is possible to advantageously use much larger locomotives than those just mentioned. Since compactness is not required of these machines they may be of larger size and heavier framework.

Some makers use one motor only on a locomotive, connected to both axles by means of some form of gearing, others use separate motors connected to each axle. As a usual thing, the controller and all the more delicate parts, if any part of a mine locomotive may be called delicate, are thoroughly housed in, so that damage from falling rock, derailment or ordinary accidents is almost impossible. The controller is usually of the drum type, which consists of a series of contacts turned against a corresponding series of fingers placed in a closed steel case.

Some haulage motors are equipped with a heavy steel pinion, placed on the axle midway between the driving wheels, which engages a rack located in the center of the track, so that on heavy grades slippage is obviated and a high tractive effort is obtained.

The Storage-Battery Locomotive

The use of storage-battery locomotives is coming into extensive use, especially since marked improvements have been made in storage batteries within the past few years. When accumulators were first developed, the weight for a given output of current was out of proportion and the battery was to a certain extent fragile and liable to breakage, but some of the modern types not only withstand rough usage, but have exceptionally large output for a given weight.

As a usual thing, two motors are used on this type of

locomotive, each directly connected to a driving axle. The great advantage in the use of storage batteries for this work is that no trolley wire is required and the machine can go and come wherever the track is laid, regardless of connection with an outside source of current.

The chief objection to these machines is that they must receive regular charges and therefore be out of service part of the time. The storage-battery machines are built in sizes from two to ten tons and several makes of batteries can be supplied with any standard locomotive. Thus the buyer is enabled to choose to some extent the battery he intends to use.

The cost per charge for a storage-battery locomotive depends, of course, upon the size and the type of battery used, as well as upon the source of power and the efficiency of the charging equipment. The frequency of charge depends upon the conditions to be met, upon the load hauled and the number of hours per day in use. The number of ton-miles it is possible to secure from one of these machines upon one charge ranges from 100 to 200 at a speed from two to five miles per hour.

It is advisable in many cases to place a wattmeter or ampere-hour meter on an electric locomotive in order to check operating efficiency and determine if the operator uses sufficient care in conserving current. A registering instrument of some kind is especially necessary on storage-battery locomotives since this instrument forms the easiest method of determining when the machine needs a fresh charge.

Several illustrations, showing locomotives of the types mentioned, accompany this article, and much valuable information may be secured from the manufacturers covering the details of these machines, operating characteristics and cost per ton-mile of haulage.

The Auchincloss Mine Fire in the Anthracite Regions

By P. H. Dever*

SYNOPSIS—Brief description of what threatened to be a serious fire in a very gaseous district. The article includes a valuable table giving the variations in the evolved gases at different stages of the trouble.

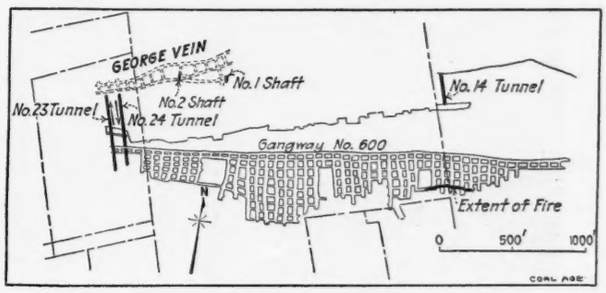
On the morning of Nov. 17, at about 10 a.m., a mine fire occurred at No. 2 shaft, Auchincloss Colliery, located in the borough of Nanticoke, eight miles south of the city of Wilkes-Barre. The mine is operated by the D., L. & W. R.R. Co.

The coal seams are being developed by two shafts, 14x50 ft. in size, each having two hoistways, one pumpway and one return airway. The shafts are located on the same surface elevation, namely 722 ft. above tide and 300 ft. apart. The deepest, or Red Ash bed, is penetrated at an elevation of 1000 ft. below tide. The part of the mine in which the fire occurred is locally known as the Nos. 23 and 24 tunnel section; these tunnels are located 500 ft. west of No. 2 shaft at an elevation of 95 ft. above tide in the George seam landing. They have been driven from the south dip of this seam across a synclinal to the George, Mills and Baltimore seams on the north dip; they are 600 ft. long, have a uniform rise of 2 per cent. and are 7x12 ft. in section. No. 24 tunnel is used as an intake airway and for haulage purposes, and No. 23 is used as a return airway. The tunnels are parallel and 60 ft. apart. A guibal fan, 35 ft. in diameter and running 52 r.p.m., with a water gage of 3 in., is employed for ventilating the workings in No. 2 shaft.

The air passing through this section of the mine is divided into two splits, 20,000 cu.ft. per min. passing through the Mills seam workings (fire section) and 40,000 cu.ft. passing through the Baltimore workings. An analysis of the return air shows 2 per cent. CH_4.

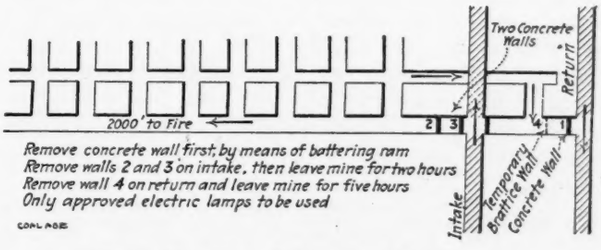
According to the second geological survey, the mine is located in the most disturbed part of the anthracite coal field. The various seams south of the shafts rise vertically 750 ft.

The employees working in this part of the mine use locked safety lamps, of the bonneted Clanny and the Acroyd & Best types. The coal is shot from the solid in both seams by means of Monobel No. 4 powder, tamped with clay and fired by electric battery. A patrolman is



Sketch Showing Location of Fire

on constant duty for the purpose of seeing that no blasts are fired in places containing firedamp, and to look after the general safety of the workmen. But, notwithstanding these precautions, a serious fire started at the face of chamber 35, which is 2700 ft. east from No. 24 tunnel in the Mills seam. The chambers here are driven directly up the pitch, which is 25 deg., and the coal is eight ft. in thickness.



Plan Showing System of Recovery

*Coal-mining department, D., L. & W. R.R., Nanticoke, Penn.

Origin of the Fire

The fire is supposed to have been started by the breaking of the glass of a safety lamp dropped by a miner, the unprotected flame igniting some very strong gas feeders, which soon set the brattice and timber afire and finally the coal. The foreman and his assistant, being in another part of the mine, were promptly notified of the danger, and after a hurried examination they found that the fire had traveled through the crosscut leading to chamber 34.

While engaged in the work of fighting the fire, using water and chemical hose, it was discovered by the officials that the air current coming from the inside section contained 3½ per cent. CH_4, whereupon all persons were removed from the mine, and after a consultation it was decided to seal the affected section. While making preparations for doing this were under way, an explosion occurred, doing considerable damage to the mine and also destroying the ventilation. Temporary stoppings of brattice cloth were used in order that the recovery work might be done quickly and the men removed from the mine, care being taken to seal the return side first. About ten hours after installing the temporary stoppings, permanent concrete dams were erected, the return side, as before, being sealed off as in the case of the temporary first. Additional dams, forming an air lock, were then built in the intake and the walls were provided with a 2½-in. pipe, for obtaining gas samples for analysis and for water-gage readings.

On Dec. 6, nineteen days after the sealing up of the fire, Assistant Division Superintendent P. H. Dever, accompanied by foremen White, Richards and Thomas, equipped with Draeger helmets, made an inspection of the fire zone and found it to be entirely extinguished, the temperature on the gangway at the entrance to chamber 35 being 68 deg. F. The temperature at the face was 78 deg. and the rock and coal were still warm, but no sign of fire was found. It was then decided to restore ventilation, which was successfully done, using the method outlined on the accompanying drawing.

On Sunday, Dec. 7, all the CH_4 had cleared, which permitted us to make a minute inspection of the workings, after temporary stoppings were erected. We then learned that the explosion on Nov. 17, had been quite violent; all concrete stoppings, which were two feet in thickness, were blown out and pulverized. Several loaded cars were upset and broken, sheet iron, props, planks, etc. were carried several hundred feet from the point where they had been left.

Recently we drilled an 8-in. bore hole to a depth of 450 ft. from the surface to reach the Baltimore seam in the No. 24 tunnel section, on the apex of the anticline, The gas pressure generated in two minutes was sufficient to blow a yellow-pine plug, weighing 31 lb., 20 ft. vertically out of the drive pipe after it had been hammered down in the hole with a 10-lb. sledge.

MINE FIRE IN THE MILLS SEAM, NO. 2 SHAFT, AUCHINCLOSS MINE. CHEMICAL ANALYSIS OF GASES.

Date, 1913	CO_2	O	CO.	CH_4	N	Water Gage — Intake	Water Gage — Exhaust	Barometer — Intake	Barometer — Exhaust	Temperature — Intake	Temperature — Exhaust	Barometer — Intake	Barometer — Exhaust
Nov. 18	0.0	19.5	0.0	3.2	77.3	1.0	0.5					28.98	29.08
Nov. 18	0.0	19.8	0.0	3.2	77.2	1.0	0.5					28.98	29.08
Nov. 18	1.2	7.8	0.0	3.0	88.0	1.0	0.5					28.98	29.08
Nov. 18	1.0	7.8	0.0	3.2	88.0	1.0	0.5					28.98	29.08
Nov. 19	1.0	7.8	0.0	2.6	88.6	1.0	0.5					28.94	29.04
Nov. 19	1.0	7.8	0.0	2.4	88.4	1.0	0.5					28.94	29.04
Nov. 20	2.4	8.4	0.0	1.3	87.9	1.0	0.5		No readings taken			28.88	28.98
Nov. 20	1.0	9.0	0.0	1.1	88.9	1.0	0.5					28.88	28.98
Nov. 21	1.2	8.8	0.0	**20.0**	70.0	0.8	0.3					29.10	29.20
Nov. 21	0.9	8.1	0.0	3.1	86.9	0.8	0.3					29.10	29.20
Nov. 22	0.0	2.2	0.0	**16.5**	81.3	0.6	0.1					29.14	29.24
Nov. 22	0.2	9.2	0.0	**11.0**	79.6	0.6	0.1					29.14	29.24
Nov. 22	1.0	5.1	0.0	**11.0**	83.8	0.4	1.0					29.14	29.24
Nov. 24	0.5	4.2	0.4	**55.8**	39.1	0.0	1.2	29.30	29.20	52°	56°	29.30	29.90
Nov. 24	0.1	4.1	0.2	**57.0**	38.6	0.0	1.2	29.30	29.20	52°	56°	29.30	29.90
Nov. 24	0.7	4.3	0.5	**52.6**	41.9	0.0	1.2	29.30	29.20	52°	56°	29.30	29.90
Nov. 24	0.1	4.1	0.0	**55.7**	40.2	0.0	1.2	29.30	29.20	52°	56°	29.30	29.90
Nov. 24	0.0	3.9	0.1	**55.0**	41.0	0.0	1.2	29.30	29.20	52°	56°	29.30	29.90
Nov. 24	0.0	5.9	0.2	**55.4**	39.2	0.0	1.2	29.30	29.20	52°	56°	29.30	29.90
Nov. 25	0.3	4.0	0.2	**71.7**	23.8	0.2	1.2	30.00	29.90	52°	56°	29.40	30.00
Nov. 25	0.6	3.4	0.1	**73.6**	19.9	0.2	1.2	30.00	29.90	52°	56°	29.40	30.00
Nov. 25	0.6	4.1	0.2	**71.5**	23.6	0.2	1.2	30.00	29.90	52°	56°	29.40	30.00
Nov. 25	0.4	3.9	0.2	**72.5**	23.0	0.2	1.2	30.00	29.90	52°	56°	29.40	30.00
Nov. 26	0.3	3.0	0.0	**73.7**	23.0	0.0	1.2	30.00	29.90	52°	56°	29.40	30.00
Nov. 26	0.4	3.1	0.1	**73.5**	22.9	0.0	1.2	30.00	29.90	52°	56°	29.40	30.00
Nov. 26	0.3	3.0	0.1	**73.5**	23.1	0.0	1.2	30.00	29.90	52°	56°	29.40	30.00
Nov. 27	Holy Day												
Nov. 28	0.3	7.2	0.3	**74.6**	17.6	0.0	1.2	30.38	30.30	44°	53°	29.85	30.45
Nov. 28	0.3	7.9	0.2	**75.0**	16.6	0.0	1.2	30.38	30.30	44°	53°	29.85	30.45
Nov. 28	0.0	8.5	0.2	**74.8**	16.5	0.0	1.2	30.38	30.30	44°	53°	29.85	30.45
Nov. 29	0.6	2.0	0.0	**78.3**	18.9	0.1	1.2	30.36	30.28	46°	53°	29.66	30.32
Nov. 29	0.6	2.2	0.0	**77.5**	19.9	0.1	1.2	30.36	30.28	46°	56°	29.66	30.32
Nov. 29	0.5	2.1	0.0	**78.1**	19.3	0.1	1.2	30.36	30.28	46°	56°	29.66	30.32
Dec. 1	0.0	1.6	0.0	**68.4**	30.0	0.0	1.2	30.30	30.19	42°	53°	29.72	30.36
Dec. 1	0.0	2.0	0.0	**69.2**	28.8	0.0	1.2	30.30	30.19	42°	53°	29.72	30.36
Dec. 1	0.0	2.4	0.0	**70.8**	26.8	0.0	1.2	30.30	30.19	42°	53°	29.72	30.36
Dec. 2	0.7	2.5	0.0	**80.0**	16.8	0.0	1.2	30.29	30.18	46°	55°	29.70	30.35
Dec. 2	0.2	4.2	0.0	**74.0**	21.8	0.0	1.2	30.29	30.18	46°	55°	29.70	30.35
Dec. 2	0.1	2.7	0.0	**78.0**	19.2	0.0	1.2	30.29	30.18	46°	55°	29.70	30.35
Dec. 2	0.5	1.8	0.0	**84.1**	13.6	0.0	1.2	30.29	30.18	46°	55°	29.70	30.35
Dec. 2	0.4	1.9	0.0	**83.3**	14.4	0.0	1.2	30.29	30.18	46°	55°	29.70	30.35
Dec. 2	0.3	1.7	0.0	**85.0**	13.0	0.0	1.2	30.29	30.18	46°	55°	29.70	30.35
Dec. 3	0.0	0.3	0.0	**80.0**	19.7	0.1	1.3	30.01	29.92	49°	53°	29.44	30.09
Dec. 3	0.4	1.8	0.0	**80.0**	17.8	0.1	1.3	30.01	29.92	49°	56°	29.44	30.09
Dec. 3	0.6	1.0	0.0	**74.0**	24.4	0.1	1.3	30.01	29.92	49°	56°	29.44	30.09
Dec. 4	0.3	3.0	0.0	**88.0**	8.7	0.0	1.3	29.84	29.75	44°	54°	29.27	29.90
Dec. 4	0.2	1.0	0.0	**84.0**	14.8	0.0	1.3	29.84	29.75	44°	54°	29.27	29.90
Dec. 4	0.3	2.2	0.0	**86.0**	11.5	0.0	1.3	29.84	29.75	44°	54°	29.27	29.90
Dec. 5	0.2	1.3	0.0	**86.0**	12.2	0.0	1.2	29.63	29.52	46°	54°	29.04	29.68
Dec. 5	0.0	1.1	0.0	**84.0**	14.9	0.0	1.2	29.63	29.52	46°	54°	29.04	29.68
Dec. 5	0.2	1.0	0.0	**82.0**	16.8	0.0	1.2	29.63	29.52	46°	54°	29.04	29.68

Note—½ of the vol. of CO_2 in CH_4 will make it non-explosive.
Note—**Full face** type indicate an explosive mixture of fire damp.

Of the total of 2444 coal cutters in use in 626 different British mines in 1912, 1134 (of which 593 were in Scotland and 290 in the Yorkshire district) were electric, against 1310 driven by compressed air. This was an increase of 136 electric and 162 compressed-air cutters. The mineral cut by electricity was nearly 12 million tons, as against about 8½ million tons by compressed air. Among the electrical coal cutters, there were 623 disk machines, 345 bar machines, 148 chain machines, 14 percussive machines and four rotary heading machines.

Coal-Dust Explosions at the Mine Inspectors' Institute Meeting

By George S. Rice* and L. M. Jones†

SYNOPSIS—A mild explosion was staged at the experimental mine, the mixture of rock dust with coal dust being almost sufficient to make the explosion impossible. Under these conditions the Rice barriers proved effective. The explosion was more violent toward the intake, and more speedy toward the return. However, neither difference was sufficient to establish any conclusions.

Test known as No. 120 of the series now being made at the Bruceton experimental mine was conducted in the presence of many members of the Mine Inspectors' Institute of America, who were assembled from various parts of the United States and Canada on June 11, 1914. Some operators and miners were also present. The purposes of the experiment were several: The most important was to determine the efficiency of various forms of rock-dust barriers in stopping the propagation of a dust explosion; another feature of great interest to many of the members, was the employment of a strong ventilating current prior to and at the time the explosion was started. The main entry was the intake and the aircourse, the return. The loading of coal dust in the two entries was made as nearly alike as possible and since the igniting shot was fired in an offset at the middle of the inmost crosscut, the conditions in the two entries were identical, except for the air current intaking on one and returning on the other entry.

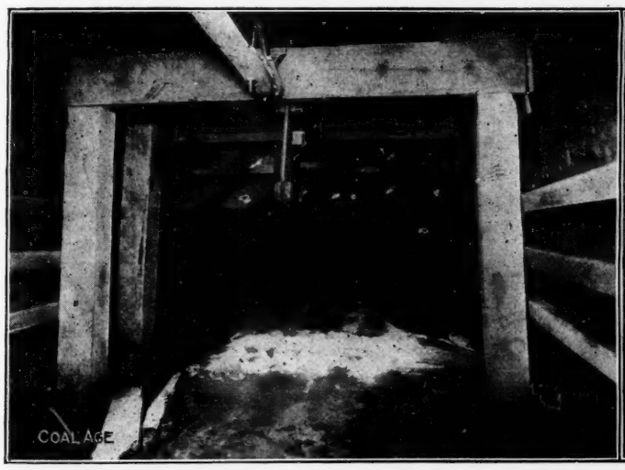
Conditions of Test

The explosion was caused by a blownout shot of 4 lb. of FFF black powder, tamped with 3 lb. of clay stemming, discharged from a cannon at the face of a 20-ft. offset, on the north side of the 1250 crosscut at a point equidistant from entry and aircourse. (See figure on page 67.). The offset and 1250 crosscut were loaded with pure coal dust; that is, coal dust not mixed with other material. The distance from the cannon through the crosscut to the center of either entry was about 50 feet.

From opposite the 1250 cut-through, the entry and aircourse were each loaded on sides and cross shelves with a mixture of 60 per cent. coal dust and 40 per cent. shale dust at a rate of 3⅓ lb. per ft. The amount of coal dust per foot of entry way was 2 lb., which is equivalent to about one-half ounce per cubic foot of entry space. This loading extended for 550 ft. outby from the crosscut. The mixture had an ash percentage of about 38 to 40 per cent.

Concentrated Rock-Dust Barrier

At the end of this zone on the entry there was installed a Rice concentrated barrier loaded with 2½ tons of rock dust. The principal features of the barrier are as follows:



Rice Concentrated Rock-Dust Barrier in Main Entry, after Explosion

Rock-Dust Stopping in Stub Heading to Right of Main Entry, after Explosion

It has two hinged platforms, 7x7x1 ft., near the roof of the entry. The floor planks of the platforms are not attached to the side boards which are fastened to timber crossbars but are hinged at one end to the crossbar of a timber set, between the platforms. The other ends of the planks of each platform are supported by an angle iron, which in turn is held up by one of a system of levers.

There are vanes hung from the roof 100 ft. distant inby and outby the barrier, so arranged that when an explosion wave causes one to swing, the movement is reversed by a pulley and chain and a pull transmitted by wire to a trigger which trips a system of levers causing the dropping of the angle irons supporting one end of each platform. Alternate planks then fall about 9 or 18 in., depending on the length of chains fastening them to an overhead timber or to the roof. The side frame of each platform, however, is still held in position.

On release, the dust, which has been placed on the

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†Assistant mining engineer, Bureau of Mines, Pittsburgh, Penn.

platforms, falls from the planks in a shower into the entry, blanketing the flame of the explosion as soon as it reaches the barrier. Should the advance-vane operating arrangement fail, another vane near the barrier, by means of a hinged bumping block attached to it, pushes the trigger, causing the barrier to act.

Box Rock-Dust Barriers

At the end of the mixed-dust zone on the aircourse were installed a set of 6 Rice box barriers, spaced 10 ft. apart from center to center, each containing from 600 to 700 lb. of crushed-shale dust. These boxes are 7 ft. long, 21 in. wide inside and 9 in. deep. They are built so that two bottom boards rest upon narrow bottom strips fastened to the box frame.

This frame is supported by 4 eyebars, the eyes resting on hooks, projecting from the roof. When the explosion wave reaches the box, it causes the latter to swing in the direction the wave is traveling until the side of the box knocks 2 hanging bars off the hooks, whereupon the frame falls, pivoting about the supporting hooks on the other side of the box, to which the other 2 eyebars are still attached.

The bottom boards do not fall with the box frame but drop a few inches when they are caught by supporting chains. More or less of the dust on these shelves either falls off as they swing or is blown off by the explosion wave. With a light preliminary wave, considerable dust may remain on the shelves which is a measure of protection against a following explosion wave.

Coal Dust Loaded beyond Barriers

Outby from both the concentrated barrier and the box barriers, were arranged 200-ft. zones of pure or unmixed coal dust to furnish fuel for continued propagation of the explosion, should it get through the stopping devices. These zones were intended to determine if the barriers just described performed their duties effectively. At the end of these coal-dust zones were placed Taffanel barriers to check the explosion should the coal dust become ignited.

First Right Butt

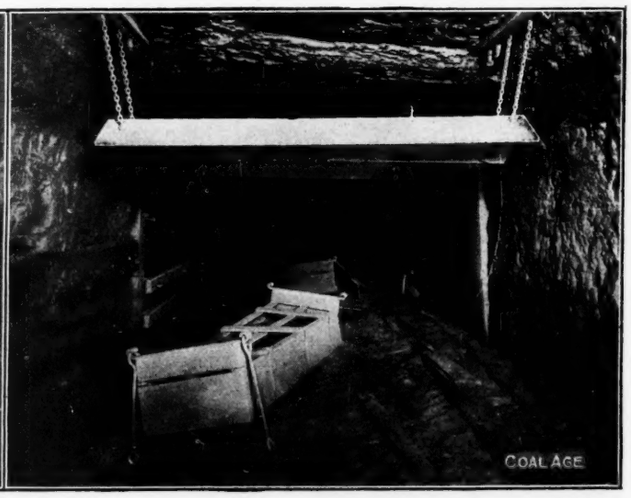
Across the mouth of this entry was built a rock-dust stopping which consisted of board sides with a compartment between them, 18 in. wide, filled with 2½ tons of shale dust The sides were braced just sufficiently to withstand the pressure of the dust filling, but not enough to give much additional strength. Coal dust was placed for 100 ft. inby from the stopping to test its efficiency.

First and Second Left Butts

In these entries, 15 ft. in from the aircourse, were built rock-dust protected ventilating doors. These doors had compartments at each side and above them, containing rock dust. The door frame held the boards of the compartments in place. When an explosion wave struck the door, the frame not being strongly braced would tend to become displaced and the rock dust would be launched into the entry. The door in No. 2 butt opened outward, while that in No. 1 butt opened inward.

Unmixed coal dust was distributed in both butt headings to determine the efficiency of the stopping devices. To obtain symmetrical conditions in the aircourse and entry, no door or curtain was placed across the aircourse between the butts.

Rock-Dust-Protected Ventilating Door in Left Butt after Explosion



Rice Box Barrier in the Return Aircourse after Explosion

Ventilation and Humidity

An air current with a velocity of about 850 ft. per min. was intaking on the main entry and returning on the aircourse. It was thought that the symmetrical loading on the two headings would permit the observers to compare the relative violence and extent of the explosion in the face of and opposing an air current of high velocity, which gave, in this case, a volume of 46,000 cu.ft. per minute.

The mine was wet throughout, and in places the bottom was muddy, while the packed clay floor was everywhere slightly sticky. The roof was studded with beads of moisture.

Recording Instruments

Recording pressure manometers were placed in stations E-1150, 750, 550, A-1150, 750 and 550. Flame circuit breakers were placed at all stations in the mixed-dust zone, and others at intervals outby. Wires were connected to the stopping devices, terminating the mixed-dust zones, to determine the relation between the time of their operation and the passage of the flame. Matches and guncotton tufts were installed every 25 ft. throughout the mine.

Explosion Appeared Mild at Mine Mouth

When the igniting shot was fired by the pressing of a button in the observatory, slight puffs of dust were noticed at the main entry and aircourse, accompanied by a muffled report. Shortly afterward more dust came from the entrances, particularly from the aircourse, and issued for some length of time. Externally the evidences of the explosion were not very marked. When the ventilating current was turned on after a cloud of rock dust had been expelled, the afterdamp accompanied by an extensive cloud of black smoke attested to a considerable explosion in the interior of the mine.

Extent of the Explosion

The flames of the explosion extended in the main entry and in the aircourse to the respective rock-dust barriers, which were placed at points 550 ft. from the outside of the mine or 700 ft. from the origin in each case. The barriers in both cases operated and flame was not communicated to the pure coal-dust zones beyond or outby the barriers.

The ventilating door in the second butt was evidently thrown down by the shock wave from the cannon, as indicated by the elapsed time as recorded on the chronograph. When the flame reached it, about 4 sec. later, there had been sufficient time to permit the rock dust to settle, so that the flame passed overhead and ignited the coal dust beyond, with the result that there was quite a strong inflammation at the head of the butt entries, sufficient to break the track and throw down shelving.

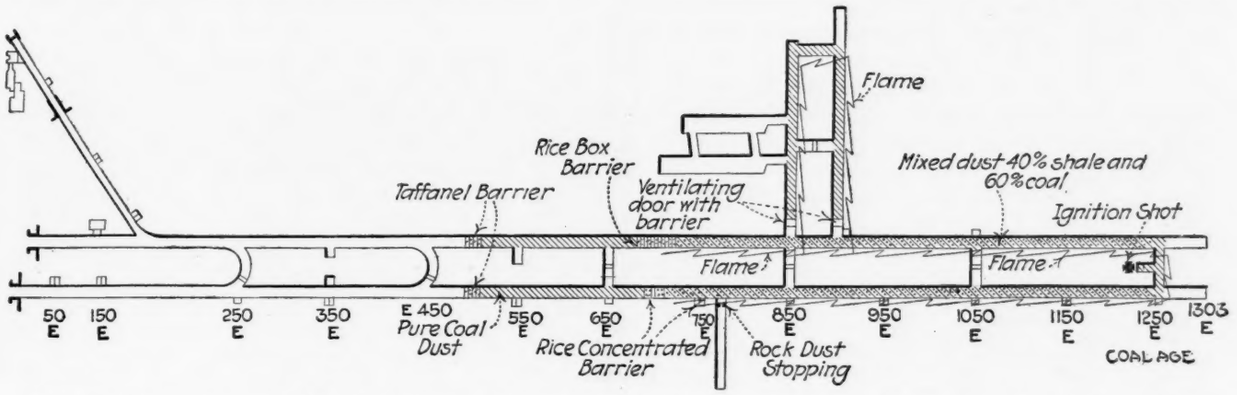
This indicated that the door frame had not been built with sufficient strength, because, for the proper operation of the rock-dust device, the frame should not have been thrown down until reached by the main explosion. This was the case with the first left butt ventilating door, probably because this door opened inward. The barrier surrounding this first left butt door was thrown down apparently by the main explosion, although it is not perfectly clear from the time records whether it may not have been thrown down by the explosion which came around from the second butt. In either case there was apparently sufficient rock dust launched into the air to quench the strong explosion coming out of the butt headings.

Pressures Produced by the Explosion

The pressures as recorded by the different manometers showed that the explosion was light, partly due to the dust being mixed, and perhaps also due to the wet condition of the mine. The maximum pressures at E-1150 was 2.4 lb., at E-750 5 lb. and at E-550 0 lb. The pressures at E-750 and 550 show the effect of the concentrated barrier in extinguishing the flame. In the aircourse the pressure at A-1150 was 1.4 lb. and at A-750 1 lb. This latter pressure, in view of the considerable development of force at the head of the butt entries, is rather surprising and indicates that the ventilating-door barriers in the butt entries, if they did not stop the explosion on entering, did so on the return wave. At A-550, outby from the box barrier, the pressure was zero.

Velocity of Explosion

The velocity of the explosion was slow; one of the slowest that has been recorded. It required 3.2 sec. to traverse a distance from the origin to the station at E-1150 in the entry, a distance of 150 ft., and 2.9 sec. to station A-1150 in the aircourse, also 150 ft. from the origin. The explosion required 6.5 sec. to reach station 750 in the entry and 5.1 sec. to reach the corresponding station in the aircourse. The average velocity of flame between stations on the return aircourse, 182 ft. per sec., was greater than the average velocity of flame between stations on the intake entry, which was 131 ft. per second.



Plan of Experimental Mine, Showing Manner of Charging with Coal Dust and Methods Adopted for Retarding and Extinguishing Flame

Effect of Ventilating Current

It would not appear from the pressure and velocity records that the high velocity of the air current had much influence on the development of the explosion. About the only variation in the action of the explosion in the two entries was that the velocity of flame on the return side was somewhat greater than that on the intake side. While this may have been an effect of the ventilating conditions, it was probably more a matter of chance than an effect of the air current, since the explosion was so slow.

Concentrated Barrier

As the explosion was light, the concentrated barrier in the entry was not broken up or injured. The shelves had dropped until the supporting chains were taut and about 80 per cent. of the dust had fallen from them, the remaining 20 per cent. being still retained on the planks. The barrier operated 5.44 sec. after the shot was fired, while the flame reached it about 7 sec. after the shot; the rock dust that sifted down apparently made a sufficient curtain of dust to extinguish the flame.

Box Barriers

The box frames were found lying on the floor of the entry, only one being damaged to any great extent. The bottom boards were all suspended from the chains and only one had been broken. All the dust had fallen from the boards, which were supported at a tilted position. The boxes operated after 4.9 sec., while the flame reached the boxes about 5.5 sec. after the shot. The rock dust was well distributed along the air course.

Rock-Dust Stopping

The record indicated that this stopping had been blown down at least partially when struck by the shock wave from the igniting shot at a period 0.473 sec. after the shot. The stopping was probably built unnecessarily light. It operated effectively, for no flame passed it.

Rock-Dust-Protected Ventilating Doors

The door in No. 2 butt had been thrown down by the shock wave at period 0.429, while flame reached this point, it is estimated, after a period of about 4 sec. The dust compartment of No. 1 left door fell, according to the time of rupture of the wires, after a period of 4.9 sec., the flame reaching this point possibly a little before.

It is probable that the flame passed into No. 2 butt over the dust pile, which had fallen possibly enough in advance so that much of the dust in the air had settled. The flame may or may not have passed through No. 1 butt barrier.

The woodwork of both doors had been broken to fragments by the return wave from the butts and the fragments thrown out to the aircourse and lay in that heading, both outby and a short distance inby from the butt heading.

The failure of No. 2 butt door is undoubtedly due to the frame being braced too lightly. It should not have gone out with the shock wave. Also it would be better to hang some of the boards from the roof by chains, as in the case of the box barriers, in order to retain some of the dust for delayed flame.

Taffanel Barriers

All but one shelf of the Taffanel barrier in the main entry were thrown down by the explosion. All the shelves of the Taffanel barrier in the aircourse remained in place and about two-thirds of the rock dust was still on the shelves. Owing to the concentrated barrier and box barrier having stopped the flame, the Taffanel barriers were not brought into action.

Conclusions

The results are valuable as showing the effectiveness of the concentrated barrier and the box barrier in a weak explosion. Their method of operation permits a surer and more effective scattering of the dust than does the open shelf type of barrier, in which the amount of dust blown off the shelves depends upon the strength of the air current. In a weak explosion, the amount blown off might be too small to quench the flame effectively.

⁂

When putting down a diamond-drill hole in sandstone or limestone, the jamming of the drill when a water cavity is reached may be overcome by a good hydraulic feed. When the ground is rotten the hole should be lined to keep it from falling in, though this reduces the size.

The Lesson

By R. T. Strohm

Written expressly for Coal Age

There are lots of modes of teaching
  How to order all our ways,
In addition to the preaching
  In the churches, Sabbath days.
Though the parsons labor longer
  To induce us to believe,
We may learn a lesson stronger
  From a grease-cup on a sheave.

Not a whimper nor a grumble
  At the irony of fate,
But instead, with manner humble,
  Working silently and late.
No such weakness as resentment
  Lurks within its grimy shell;
Filled with grease and deep contentment
  It performs its duty well.

Every night its task is ended
  Where its morning work began;
Though its travel is extended,
  Yet it has not moved a span.
Still, dissatisfaction spurning,
  It has jubilantly whirled,
Never tempted by a yearning
  To be off to see the world.

Gamely it continues going
  In its narrow little sphere,
And, in spite of usage, growing
  More efficient, year by year;
Never longing for inaction,
  Never seeking for a rest,
But, with quiet satisfaction,
  Doing just its level best.

⁂

Utah Breaks Record

The production of coal in Utah in 1913 was 3,254,828 short tons, with a value at the mines of $5,384,127, according to E. W. Parker, of the United States Geological Survey. In 1912, for the first time, Utah's coal production exceeded 3,000,000 tons, the output in that year amounting to 3,016,149 short tons, valued at $5,046,451. In 1912 the industry suffered from a scarcity of labor, due to the exodus of foreign miners to the scene of war in the Balkan States.

The increased production in 1913 appears to have been due principally to activity among the metalliferous mines and the smelters, as nearly all of the increased production was in the quantity of coal made into coke, this item alone indicating a gain of 225,561 short tons out of a total increase of 238,670 tons.

Nearly 90 per cent. of the total coal production of Utah is mined in Carbon County, which contains a large part of the great Uinta Basin. This county produced in 1913 2,830,102 short tons, out of a total for the state of 3,254,828 tons. The industry was practically free from labor troubles in 1913, only one company reporting idleness from this cause, and only five men being disaffected.

The Labor Situation

SYNOPSIS—Several wage contracts have recently been signed. To western Pennsylvania and Iowa as states with completed contracts have been added West Virginia, as far as the union is recognized, and southern Ohio. A speedy agreement in Illinois is foreshadowed. In the other sections no approaches to a settlement have been made, but the effect of agreements elsewhere cannot fail to influence the result.

As stated in brief in last week's issue, the executive board of the United Mine Workers district organization (No. 17) in West Virginia declared the referendum vote in 19 out of 50 local unions had been cast illegally or returned in a manner not in conformity with the by-laws. It has been alleged that in two local unions more votes were cast than there were members on which capitation tax was paid to the organization, and in other cases the official seal had not been stamped on the returns.

ARBITRATION AND THE CHECK-OFF

The second vote was more definitely in favor of the arbitral proposition with the check-off than the first is said to have been. When the report was made, it was found that 1304 voted for the proposition and 949 against, giving a majority of 355 votes. As a result, it is said, 7000 men will go back to work.

The miners will now appoint a committeeman as they should have done long ago, had they acted in accord with the report of the board of conciliation. They will also go back to work, another point in which they failed to act as the board requested. D. C. Kennedy is appointed by the Kanawha Operators' Association as its representative on the arbitral commission.

THE AREA OF WEST VIRGINIA AFFECTED.

The strike commenced June 1, and has lasted barely over a month. Among the mines affected by the resumption are the Plymouth, Black Betsy, Raymond City, Blakeley, Campbell's Creek, Coal Fork, Quincy, Monarch, Shrewsbury, Ward, Mammoth, Big Mountain, Hughes Creek, Cannelton, Marting, National, Carbondale, Smithers, Longacre, Harewood, Boomer, Powellton, Elkridge, Columbia, Diamond, St. Clair, Eagle, Montgomery, Eureka, Crescent, Handley, Coalburg, Winifrede, Belmont, Crown Hill, Olcott, Rammage and Clothier.

The conclusion of the strike is hailed as a great victory for the administration by some parties. As a matter of fact, the only question at issue was the check-off, and as the operators realized that this did not come out of their own pockets, they were not disposed to make an urgent fight against it. Both parties conceded to the commissioners on the 10th of June that there was no wage dispute.

PAINT CREEK AND CABIN CREEK NOT IN THIS AGREEMENT

Nor does the decision, as has been reported, mark the end by conciliation and arbitration of the Paint Creek and Cabin Creek disturbance, for none of these mines is included in it, the mines along these creeks having settled their difference with the miners long ago. The area covered is quite restricted and does not even include the whole union field. Thus a 3-year working contract was concluded between the union and the operators of the Pomeroy Bend district of West Virginia on June 10 at Hartford City, Mason County. In this agreement also, the check-off was conceded.

On the 30th of June, the Scotford Mines of the Bell Coal Co. on Bear Creek in Clay Co., signed a working contract with the union. At last reports, the Four States Coal Co. and the Milburn Coal Co. were still idle. Now the dispute is settled with the Kanawha District Operators' Association, it is likely that the difficulty at the mines of these companies will be pushed to a conclusion.

THE SOUTHERN OHIO COAL FIELDS COMMENCE WORK

In Ohio, as we mentioned last week, the operators of the Hocking, Pomeroy, Jackson and Crooksville districts remained in session with the United Mine Workers after the eastern Ohio and Cambridge operators withdrew. As a result, the operators and miners finally agreed on a scale providing 47c. per ton of mine-run coal mined by machine, and 67.6c. for pick-mined coal.

The full text of the general agreement follows:

(1) All coal to be paid for on the mine-run basis.

(2) The price for machine-cutting, hand-drilling and loading of clean merchantable coal in wide work to be 47c. per ton.

(3) The price for pick mining to be 67.6c. per ton.

(4) The present differential above the Hocking Valley scale to be retained on a relative basis.

(5) All narrow work to be paid for in the same proportion as under the Cleveland agreement.

(6) The price now paid for inside work to be affirmed.

(7) Eight hours to constitute a day's work.

(8) All internal questions, both as to price or conditions, to be referred to the different districts for adjustment. In adopting the mine-run basis, it is proposed that the coal shall be mined in a careful, workmanlike manner and that, in all scale districts, a rule or rules will be agreed upon requiring that such be done.

When the agreement is ratified by a referendum vote of the miners in the districts affected, mining will be resumed. It is believed that the referendum vote can be taken and counted in less than two weeks. While the scale is not satisfactory to the operators they will make an honest effort to work under it. The Ohio Industrial Commission will now have the task of fixing rules to govern the percentage of slack and impurities.

Operators in eastern Ohio, Cambridge and a portion of Crooksville are arranging to meet the miners in conference next week. The miners insist they will not give a lower scale in the districts that have not signed up.

THE PITTSBURGH VEIN OPERATORS ASSOCIATION

It may be stated that the Pittsburgh Vein Operators Association feels much aggrieved at the statements made that it has been unreasonable. It states truly in a long advertisement in the "Martins Ferry Daily" of July 3, that it has been willing to sign the old scale as have the other operators in other districts, as for instance, those in the Pittsburgh region, but the union and the law demand alike a new scale. It has offered an equivalent scale giving 99c. for lump coal and 2c. for slack. It has also agreed to give 41.12c. per ton for run of mine, that being also, it declares, the equivalent of the Pittsburgh price.

The association quotes the failure of several companies working on a mine-run scale as evidence of the unfairness of the competition existing where a mine on that basis has to compete with one where only lump coal is paid for, though at a higher compensatory rate. It declares that the steady operation of the eastern Ohio mines which has been secured by the building of docks in the Northwest by the Ohio operators, will be entirely destroyed if the mine-run scale, which the union proposes and which the Pittsburgh vein operators declare is inequitable, is adopted. The latter claim that for 5 or 6 years, the dock trade, secured at much expense, has caused the eastern Ohio district to be more steady in operation than the adjoining fields in the same state.

THE QUANDARY OF THE OHIO MINERS

It is clear that the miners in eastern Ohio are suffering severely from the present idleness. They are certainly to be commiserated. They are victims of their own successes. They have long succeeded in holding the wages of the Ohio district, with its generally less desirable coal, on a level with those of the Pittsburgh region. As a result, the number of days worked has been low. In 1912, the mines in Ohio operated only 199 days as against 255 in the Pennsylvania bituminous regions.

The reason for their action in trying to maintain wages is perfectly reasonable. The coal is dirtier for the most part and needs more cleaning. The bands are often large and the removing of them troublesome. Why should not the wage scale be at least as high as where the coal is cleaner? The answer of the operators, which seems so hard to devise, is however easy—the coal being inferior must sell at a lower price, and if the miner and operator cannot agree to mine it at that price, they must leave the market. As the operators profits are infinitesimal, the only hope lies in the miner accepting a lower recompense or in his vacating the state of Ohio where only lower wages can be paid.

The miners assembled at Martins Ferry on June 26 and condemned the practice of sending away the money collected at home for the benefit of strikers elsewhere. They feel that if they had not done this in the past, none of them would have had to seek charitable relief during their present dispute.

Most energetic attempts have been made by the Industrial Workers of the World to induce the impoverished miners to

commit acts of violence, but to the great credit of the union miners, it must be said it has been entirely without success and it tends to prove that where the unions are strongly entrenched, they may tend to seek concessions which the economic situation does not merit but they do not evidence a disposition to riot. And it may be here stated that none of the strikers has received more than $1.50 since the strike started on the first of April. Their financial condition certainly is desperate; that their counsels are not equally desperate under the urgent incitation of unscrupulous agitators testifies to their law-abiding disposition.

The miners held a mass-meeting at Bellaire, O., in the auditorium of the city building. One resolution, apparently by an I. W. W. sympathizer, urged all miners' local unions to hold mass meetings to fix a limit of 15 days during which the operators were to be required to sign a scale as demanded by the officials of the organization and failing to reach an agreement by that time, all settlements to be declared off for a specified time. The resolution urged the state officials to raise funds to carry the strike to a successful issue, and also urged the investigation of the policy of the national organization in withholding benefits from the Ohio miners.

The second resolution, even more clearly coming from an I. W. W. source, urged "That we ask that all miners who are working, stop in sympathy with the Ohio miners and that if there is not a settlement soon, we ask that steps be taken to prevent the delivery of coal, which is now being hauled through Ohio, stopped."

The I. W. W. men tried to break up the meeting and the officials left in disgust. Police were summoned to the hall and an executive session was called, the reporters being expelled. The I. W. W. men were left in full control of the meeting but apparently no resolutions were passed.

A UNIFORM WAGE SCALE

Advocates of uniformity of wage scales and working hours, such as Dr. D. W. Boone, the Bellaire city health officer, overlook the need which must always exist for diverse wages unless men are to be deported from one state to another where the coal is better or more favorably located. A federal law calling for all fields of wheat to be of equal productivity would be almost as effective.

In fact nothing but a readiness of labor to accept lower wages or to be satisfied with shorter periods of work enable some coal areas to produce. The Ohio miner has been obliged to accept the work available when the price of coal in the market was good. Had he subjected himself to a differential, he could have worked steadily. He is in the unfortunate position of the man who farms a stony or hillside field; he must work harder and receive less or hunt a better field for nature is inexorable and the will of man inadequate to make redress. However, it must be conceded that the Ohio miners are competing with some operating concerns whose scale of wages is too low.

NORTHERN OHIO, CENTRAL ILLINOIS AND INDIANA

A break in the union in the Fifth sub-district which includes Belmont County is expected. It is even said that an ultimatum has been delivered by the men to the union officers that, if in 30 days no settlement is effected, they will sign up individually with the operators and return to work.

The Central Illinois Coal Operators' Association has agreed with the United Workers of America upon a scale in the Springfield district making the machine-mining rate 80 per cent of the pick-mining price.

In Indiana the minority in the union has called for a special convention for July 21. Seventeen locals have sent petitions asking that a special convention be called to consider charges that state union officials have violated the terms of the wages contract in settling grievances and did so in favor of the operators. Specific charges are brought against William Houston, president, and Thomas Moss, member of the executive board.

THE SOUTH-WESTERN COAL FIELDS

The conference at Kansas City, Mo., still continues. John P. White regards the situation in this section as so serious that he is giving it his personal attention. He is, moreover, in an excellent location to keep an eye on the Western situation.

The trial of P. R. Stewart, president of the Arkansas district of the U. M. W. of A., and others charged with violating an injunction by interfering with the operation of the Mammoth Vein Coal Co.'s plant, began at Forth Smith, Ark., on July 2. The conditions leading up to this trial were described in our issue of July 4. Joseph Hayden, a hardware dealer of McAlester, Okla., testified that Fred W. Holt, secretary of that district, bought from him between 20 and 25 rifles and 100 rounds of ammunition for each, to be sent to the strike fields.

NO CHANGE IN COLORADO

In Colorado, we hear that J. C. Osgood, president of the Victor-American Fuel Co.; J. F. Welborn, president of the Colorado Fuel & Iron Co., and C. W. Brown, president of the Rocky Mountain Fuel Co., conferred with the legislative committee on the miners' strike on June 25. Hywell Davies has been traveling through the strike zone and William R. Fairley has been in conference with the strike leaders. But so far, from what can be learned, no action has been decided on.

ALBERTA STRIKE

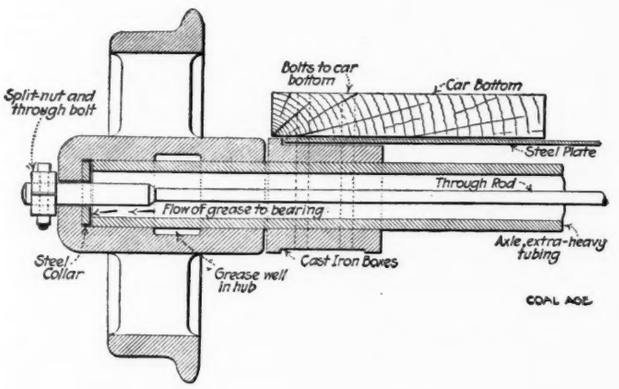
Three hundred miners of the Brazeau Collieries Ltd., at Nordegg, Alta., are on strike, demanding a wage increase. In April these men became organized in the United Mine Workers Union, but the officials from Fernie could not get the company to sign an agreement. A verbal contract was made by which the scale then in force would continue until June 15, and promising that a new schedule suitable to both parties would be drafted by that date. Apparently the men sought to assure themselves of a satisfactory scale by striking in the closing weeks of June.

WALES VERSUS U. M. W. OF A.

On July 1, a jury was completed at Binghampton, N. Y., to try the case of A. D. Wales against the United Mine Workers of America to obtain $200,000 for services in settling the anthracite coal strike in 1902. The evidence of Theodore Roosevelt given in New York City and to which reference was made editorially in our issue of June 6, will be read to the jury.

A New Mine-Car Truck

To meet the growing demand for a running gear that will be reliable, economical to lubricate, and one that will operate with a minimum amount of friction without the use of rollers the truck illustrated herewith was invented and developed by J. F. Fox, of Birmingham, Ala., and manufactured by the Southern Wheel Co.



CROSS-SECTION OF TRUCK

The main feature of the construction is the axle, which is made of extra-heavy steel tubing, and acts as a reservoir for the lubricating grease. This lubricant is fed out of the open end of the axle into the wheel hubs by the side motion of the car and the force of gravity. This method produces practically a bath lubrication.

The wheels are held in running position by means of a round rod, which passes through the axle and the wheels and is secured at the end by means of a split nut and through bolt which clamps the nut on the rod. Since the fastening rod is free to turn with the wheels there will be no friction, and therefore no wear between the wheel hubs and the nuts, except the small amount due to the difference in velocity of the wheels in rounding curves.

This method of fastening is extremely simple as removing one small nut releases the wheels and axle from the car and furnishes a frictionless wheel fastening that cannot be destroyed by wear.

These trucks have been tried out for the past 15 months under the most severe conditions by the largest operators in the Birmingham district, and have fully met the expectations of the designer, and are filling a long-felt want in the mining industry.

Beehive Oven Coke

By a Pennsylvania Superintendent

SYNOPSIS—Coke ovens were first employed in the United States in 1841. Although Connellsville coke is regarded as a standard with which to compare other metallurgical fuels, byproduct ovens, on account of their greater economy, are steadily increasing in numbers.

To those who are not familiar with the usages in vogue when coke was first made in this country, I will outline briefly the original methods employed. Coke was first made in this country in 1817. It was not burned in bee-hive or rectangular ovens but in pits in the ground. The coal was taken from the Pittsburgh or what at this time is better known as the Connellsville seam. Many experiments were made in using this fuel for iron smelting, etc., up to 1825, while the first reliable information we have on coke ovens relates to the year 1841.

The U. S. Geological Survey has published a report showing the progress of the manufacture of coke as follows:

COKE IN THE UNITED STATES

Year	No. of Companies	No. of Ovens Built	No. of Ovens Being Built	Coal Used, Tons	Coke Prod., Tons	Yield
1880	186	12,372	1159	5,237,741	3,338,300	63%
1890	253	37,158	1547	18,005,209	11,508,021	64
1900	396	58,484	5804	32,113,543	20,533,348	63.9
1901	423	63,951	5205	34,207,965	21,795,883	63.7
1902	456	69,069	8758	39,604,007	25,401,730	64.1
1903	500	79,334	6175	39,423,525	25,274,281	64.1
1904	506	83,599	4430	36,531,608	23,661,106	64.8
1905	519	87,564	4751	49,530,677	32,231,129	65.1
1906	532	93,901	4519	55,746,374	36,401,217	65.3
1907	552	99,680	2546	61,946,109	40,779,564	65.8
1908	551	101,218	2241	39,440,837	26,033,518	66.0
1909	579	103,982	2950	59,354,937	39,315,065	66.2
1910	578	104,440	2567	63,088,327	41,708,810	66.1
1911	570	103,879	2254	53,278,248	35,551,489	66.7

IN PENNSYLVANIA IN 1911 THERE WERE

Bee Hive Ovens Built	Bee Hive Ovens Building	Byproduct Ovens Built	Byproduct Ovens Building	Total Number Built	Total Number Building
53,612	971	1292	300	54,904	1271

From the above may be seen the steady gain in byproduct ovens.

The chief requisite in coking is to obtain from any given quantity of coal the maximum amount of coke with the least consumption of the fixed carbon of the fuel. A bee-hive oven is a circular vaulted firebrick chamber built on a good foundation of tamped clay. An opening is left in the top whereby the oven is filled. This also allows the gases evolved in coking to escape. An arched door is provided at the bottom through which the coke is drawn.

The Quality of Materials Used Means Much

Care must be taken in the choosing of brick, tile for the bottom, jambs for the doors and arches. As the oven attains a great heat, 2000 to 3500° F., it is necessary to use material which will withstand this high temperature. The filling is an essential part in the construction of ovens. Filling which has lime or iron in its make up should not be used as when the oven attains its greatest heat, these constituents become viscous, run, make holes in the brickwork and cause the ovens to cave in.

To get good coke, ovens must at all times be kept in good condition. Crowns should never be exposed, but should have from 8 in. to 18 in. of good loam filling to take care of winds and rains and hold the heat to insure the quick ignition of the coal, thereby producing at all times the maximum amount of coke from the coal charged. It is better to overcharge an oven than to undercharge it because the maximum heat should be retained as nearly as possible, up to the time when the oven receives its next charge.

In the making of good coke, leveling is one of the most important processes. Either through ignorance or neglect on the part of superintendents, and other officials, this detail is usually left to the levelers, who are not always properly trained to the work, and who, being paid by the piece, naturally desire to level as many ovens in a day as possible.

Improper leveling leaves different heights of charge which coke to the bottom in different periods of time, with the result that the top surface of the coke is exposed to the action of the air admitted for the completion of the process and some coke is burned and lost. On the other hand, the high places will not entirely coke through and leave black butts and part coke or coal on the bottom.

Coke Varies Physically and Chemically

Coke varies in external appearance, physical properties and chemical composition. It may be dull gray, light gray, or light gray and silvery in color. It may be rough, but that part of the charge next to the walls of the oven is often smooth.

The color of coke is due mostly to the kind of coal it is made from. Coke should only be watered once, both to insure a good appearance, and to keep heat in the ovens. Watering should not be done with part of the door up, as this floods the oven and cools the bottom, thus retarding the catching up of the following charge, not allowing it a sufficient time to burn, thereby either lowering the quality or decreasing the tonnage secured.

All coke is more or less cellular, generally it is permeated by a fine system of inter-communicating pores.

Pennsylvania has from the beginning of coke making in the United States maintained the supremacy in production. The bee-hive oven coke from the Connellsville district is still considered the standard coke.

Some time ago, ovens were not expected to yield over 66 per cent. of the weight of coal charged, but now it is a superintendent's or yard boss' business to get the greatest yield possible. In many cases in the Connellsville field 70 per cent. of coke is taken from the ovens. This is brought about by employing coke burners—men who know just when an oven has reached the state wherein the different changes have taken place and a further continuance of the process would result in waste. The oven is then sealed up and held to this stage until drawn.

The making of coke, while not the most pleasant kind of work, is yet very interesting, for what will apply to one locality will not in many cases hold good in another. The coke maker must determine the condition of the charge from the flame given forth through the tunnel head and be guided accordingly.

The Denbo Mine of the Reliance Coke Co.

SYNOPSIS—A modern plant erected with uptodate rapidity and producing with economy the limited demand of the ovens which it is to supply.

There is an atmosphere of satisfaction about the ordinary coke plant, which compares somewhat strangely with the evidences of strain around the ordinary coal mine, for the most manifest condition at a shipping colliery is the daily striving to beat a previous record. There is no rest; the record once established will have to be broken tomorrow. But in the coke plant, there is a fixed limit. Once it is reached safely, the need for increased output is entirely at an end, and the management has time to approach questions of efficiency and economy.

The Coke Ovens

The plant at Denbo has nearly reached its maximum tonnage—just enough to supply with coal the 200 ovens in blast and the 106 houses in the mine village. There

A View of the Coke-Oven Yard, Showing the Projecting Track at the Tops of the Ovens from Which the Doors Are Hung before Being Opened

are 36 ovens not in commission, and when another 64 are built, the plant will increase its output accordingly and mine about 1000 tons per day. But a deep ravine cuts off the ground suited to this extension, and consequently it may be some time before the ovens are built.

The ovens are of the Mitchell type, 30 ft. long, and the doors by which they are closed are illustrated in an article in this issue entitled, "Some Types of Coke-Oven Doors." The ovens are built entirely without any taper from one door to the other, and there is no difficulty in pushing them despite that fact. The coke shrinks sufficiently on cooling so that it does not bind in the oven. The equipment of the ovens does not vary in any way from the ordinary battery of Mitchell ovens with machine operation, except perhaps in the doors, and consequently further description is unnecessary. Each oven is charged three times a week, the furnace-coke charge being about 27 or 28 in. deep and the foundry about 33 inches.

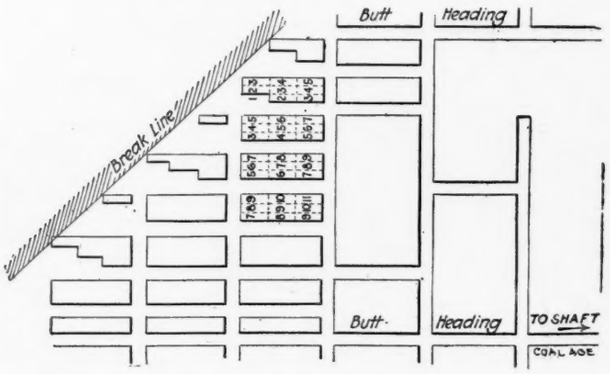
The Shaft and Storage Bins

The mine shaft is 78 ft. deep, so that the coal is at a level with the bed of the Monongahela River. Yet, though the valley is narrow, so that it is hard to find room for town and plant, there is little water in the mine. The headframe is of steel and was erected by the Riter-Conley Mfg. Co. It has self-dumping cages, and the coal falls, on being dumped, into a 200-ton capacity steel bin.

It is then crushed in a crusher, manufactured by the Williams Patent Crusher & Pulverizing Co. This reduces the coal till it will all pass a screen of 2½-in. mesh. The coal is not washed, but goes directly to an 800-ton steel bin, where it is stored and discharged into the electric larries for distribution to the coke ovens. These were supplied by the Connellsville Manufacturing & Mine Supply Co., but are of a special design.

The Power Used Underground

The bed mined is the Pittsburgh, and the coal is from 7½ to 8½ ft. thick. Consequently, a 2-ton car is used. This is made of wood and holds 50 bu. when loaded level full. To make it stiff, it has a strong steel bottom frame.



Proposed Method of Mining at the Denbo Mines. Shortwall Machines Will Be Used. Cuts Will Be Taken in the Order in Which They Are Numbered

At present the gathering is performed by horses, but General Electric locomotives are operated on the main entries. It is the intention eventually to dispense with animal power throughout, substituting electric locomotives in its place.

The current used in the mines is at a pressure of 250 volts, and is generated by two 250-kw. Westinghouse dynamos. This current actuates not only the haulage motors, but the coal crusher, all the oven machinery, three Goodman breast machines, two Sullivan shortwall cutters and the hoisting machine by which material is lowered into the mine. The hoisting of coal is not performed electrically, but by a Vulcan 24x30-in. hoist.

Coke Breeze Furnishes Power

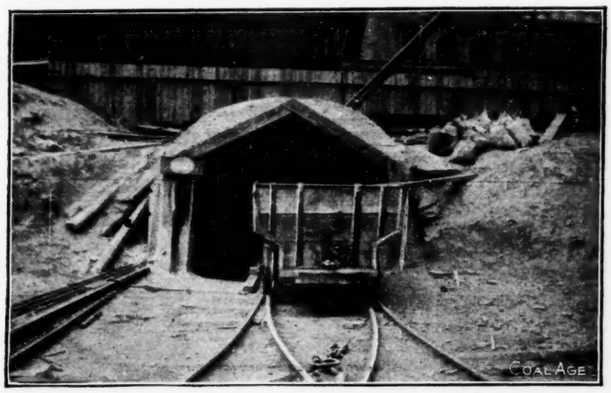
The three 350-hp. Rust boilers are fired with coke breeze, which is hauled from the ovens by horses and carts, and dumped above the boilers. The slope of the hill enables these to be set at a low level, so that the breeze need not be elevated. A little coal is mixed with the fine coke, and the mixture is fed to the boilers by Parsons

stokers. The boilers are capable of 100 per cent. overload. A 150-ft. steel stack, 6 ft. in diameter, supplies the draft. One man tends the boilers and another the generator and hoisting engine. The boiler ashes drop down into bins over a tunnel and are removed by small industrial cars.

The Underground Conditions

The coal is cut on the bottom of the seam and shot down with Miner's Friend "Safety Powder" exclusively. There is a good 30-ft. sandstone roof above the 10-in. draw slate and 10-in. rooster coal. Ventilation is secured by a 14-ft. Jeffrey blower fan having 4-ft. blades. This is capable of supplying 250,000 cu.ft. of air per min. at 6 in. of water gage. Ultimately, the fan will be used as an exhaust. As the mine is damp, the entering air is not moistened with steam.

The second opening is the material slope, the hoist of which was previously mentioned. This is 250 ft. long and concreted at the top, bottom and side. The mouth of this escapeway is shown in the accompanying illustration. The whole shaft bottom is supported by 15-in. I-beams at 6-ft. intervals, resting on other 15-in. I-beams, which are themselves carried by brick pillars which are spaced 12 ft. apart and are 18 in. square. All the



The Concreted Slope Serving as Second Opening, Manway and Material Hoistway with Coke Ovens and Yard in Rear

brattices in the mine are of brick set in cement, and all doors on the airways are of steel.

The track in the bottom is of 65-lb. steel; the haulage roads are laid with 45-lb. steel and the rooms with 20-lb. Wood ties are used throughout the mines. The mine is being worked on the room-and-pillar system, but the plan of shortwall mining, illustrated in the accompanying figure, is proposed and will probably be installed. It is said that in another mine, in a working area 900 ft. long and 900 ft. wide, a tonnage of 1500 tons a day was obtained using this system. The butt headings will be about 300 ft. apart and the room crosscuts will be made about every 35 ft.

The general appearance of the plant is strongly in its favor. The power and repair houses are both of brick and are covered with cement tile. The repair shop measures 40x100 ft. and contains in the blacksmith, carpenter and machine shops, all the tools needed for rapid mine-repair work.

Quick Construction Work

That the mine is quite new and that all due speed was used in opening it, can be judged from the fact that the shaft was not started till October, 1912. The coke ovens were put into operation September of the following year. The headings to be driven before coal could be obtained in operating quantities were quite lengthy, between 3200 and 3800 ft. long. This was because the shaft had to be sunk at the edge of the coal territory. However, this driving was speedily effected, the headings each progressing 65 ft. a week with only two shifts at work. Goodman breast machines were used, which sumped 7 ft., assuring 6 ft. 6 in. of actual progress per cut. No work was done on Sundays.

The town is more than usually pleasant, though the miner's houses are all double. There are six foremen's houses, all piped with hot and cold water and fitted with baths and electric lights. There are 50 five-room and an equal number of four-room houses for miners. Each has an outside closet, with an outlet to a sewer. This is flushed occasionally, the water passing into a large cesspool.

The town is netted with a 4-in. water line, carrying river water and affording fire protection. The supply for drinking is derived from wells bored about every 300 ft. These are cased for about 35 ft. of their depth. The wells are from 50 to 60 ft. deep, excellent water being found in the sandstone above the coal.

No Smoke and Many Healty Trees

The houses are placed up the river, so that the full length of the steam plant and a little park lies between the ovens and the bulk of the town. That little park is itself the best evidence of the truth of the assertion that only about three times in two years has the wind blown up the river and carried the smoke formed at Denbo and at Alicia, which is across the river, toward the mine houses. The little trees are quite fresh and healthy. The town is lighted throughout with 150-watt Mazda lamps. There is a two-story commissary with cemented cellar and a refrigerating plant for cold storage and ice-making.

Fritz Hofwing is manager and mining engineer, and G. C. Landis, of long experience in the coke business, is superintendent.

Pacific Coast Collieries Co.—In connection with a new bond issue this company has made the following statement re its properties: The holdings comprise large coal areas owned, licenses, rights, etc., on the east coast of Vancouver Island, mine plants, railways, employees' houses, docks, surface lands, timber lands, a terminal property of over 100 acres at deep water on Boat Harbor, with bunker (storage capacity, 4000 tons), and washing and sizing plant of an output of 900 tons per day (less than half the output of coal is to be washed). On the South Wellington and the Suquash properties alone there is estimated to be over 200,000,000 tons of coal. The coal in the South Wellington Mines is a high-grade bituminous coal, for both steam and domestic use. The Suquash mine, upon which development work was started only very recently, is situated about 100 miles north from the South Wellington Mines.

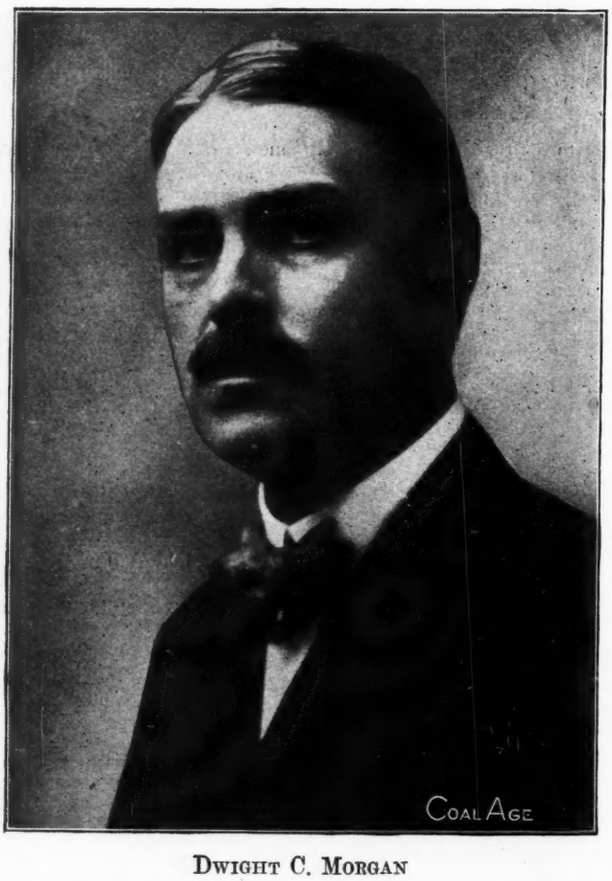
With the completion of the 12-mile railroad, and with the equipment now being installed, the company will be able to handle up to 2000 tons per day.

Sinking fund from May 1, 1915, 7c. per ton of 2240 lb. run-of-mine coal, the minimum annual $60,000, to redeem the bonds at not over 105 and interest.

Wellington Mines Nos. 1 and 2 have been in operation for some years, while No. 3 mine is practically now ready for production. Two 650-ft. shafts having been sunk and equipped for an output of 1500 to 2000 tons a day. Exclusive of the Suquash property, the General Manager estimates the production from Wellington Mines Nos. 1, 2 and 3 for the year 1914-15 at 400,000 tons and for 1915-16 at 750,000 tons, on which basis they should show, after allowance for deple-

Who's Who in Coal Mining

The Allegheny River Mining Co., with headquarters at Kittanning, Penn., is one of the live coal corporations of the Keystone State. At the present time the output of this company's mines is about 9000 tons per day. Several new mines are under construction or have been planned. The progressiveness of the Allegheny company is principally due to the determined efforts and shrewdness of its president, Dwight C. Morgan. He is the mainspring of the company's present organization and is regarded generally as a most important factor in Eastern coal-mining circles.



DWIGHT C. MORGAN

Mr. Morgan was born at Dwight, Ill., in 1868. He comes of a line of ancestors of wide reputation in science and engineering. He is descended from Dr. Richard Price, who was famous as an economist. His grandfather was Richard Price Morgan, Sr., a graduate civil engineer, who made the first surveys for the New York Central & Hudson River R.R., and the first surveys for the Chicago & Galena Union R.R., which was the first steam road built out of Chicago. His father, Richard Price Morgan, Jr., also a civil engineer, is generally known as the father of the elevated railroad system of New York City. He was greatly interested in the development of engineering in American universities and was given the degree of Doctor of Engineering by the University of Illinois.

After receiving his early education in the public schools of his native town, Mr. Morgan graduated from the University of Michigan, in 1893. Aside from being president of the Allegheny River Mining Co., he is vice-president and director of the Pittsburgh & Shawmut Railroad Co., president and director of the Allegheny River Realty Co., director of the Armstrong County Trust Co., and president of the Allegheny River Improvement Association for river navigation between Pittsburgh and Oil City.

In his earlier days, Mr. Morgan was engineer in charge of the valuations of the railroads of Minnesota and at one time was commissioner of the United States Supreme Court to settle the boundary-line dispute between Iowa and Missouri.

He is a member of the Western Society of Engineers, Duquesne Club, Railway Signal Association and Pittsburgh Traffic Club, and has lectured on engineering topics at the Universities of Illinois and Minnesota.

Fire at Cinderella, W. Va.

A fire occurred recently at the mines of the Sycamore Coal Co., at Cinderella, W. Va., and five men who were in the mine at the time were suffocated. It is said that more would have been in the mine and would have succumbed to a like fate had they not stayed on the surface to celebrate appropriately the first day on which West Virginia "became dry." The fire broke out late in the evening of June 30.

Cinderella is a new plant, built by G. S. and S. W. Patterson, of Vivian, W. Va., the proprietors of the ill-fated Bottom Creek mine. It is located east about 4 miles from Williamson, in Mingo County. The company is mining two seams of coal, the Coalburg and Winifrede, roughly 60 ft. apart, both ventilated by the same fan. Fire, probably originating from crossed electric wires, started in the fan house, destroying that structure. Apparently the fan continued to run and forced the fumes down into the mine, where the men were at work.

The fire in the Coalburg or upper seam was so severe that it destroyed a brattice 40 ft. from the drift mouth, where the first left entry led off. All the men were in this left entry and it was impossible for the rescuers to enter it. As the main entry passes through the mountain, the rescuers were able to reach the fire from the front and behind. In a short time, however, both coal seams were on fire, but with a hand pump the blaze was soon extinguished in the Winifrede seam.

A large pump was brought from Vivian to play on the fire, pipe having been laid for that purpose before the pump arrived. It was thought futile to reach the men through the burning entry, and so Engineer Maurice made a survey in the underbrush before daylight, using carbide lamps, to discover which was the most feasible place for an opening from the surface through which to reach the men. The entry was struck about 2 p.m. on July 1.

The rescuers had no trouble entering as the air was good. A suction fan had been placed in the drift mouth early in the morning to draw out the bad air and lower the temperature and it is thought that had the men retreated to the rear end of the workings and barricaded themselves in, they might have been saved.

According to the U. S. Geological Survey, West Virginia miners work an average of 266 days each year. The only other states that work more days than West Virginia are Utah, where the average is 285 days, and New Mexico, where the average is 284 days per year.

Editorials

Some Psychology

President Wilson recently said that our present financial condition was due to psychological causes and some barren wits have changed his statement and now make him allege that general stagnation of business was psychological and not real. This is untrue; causes may be mental, that is psychologic; conditions never are. In fact, nearly all our present well-being as compared with the ill-being of savages is psychologic.

For the material for well-being was just as much present two thousand years ago as today, but men did not have the present viewpoint which has changed the face of the earth. The change is psychological in its origin though material in its result. We have permitted and shall permit ourselves to use the scholiast's word "psychologic," but perhaps the word "mental" is a better and a less pedantic expression, because the viewpoint is mind itself and would not be changed even if there were no psychology, which is merely the science of the mind.

We have spoken of business, but it is not of the present depression in trade of which we are thinking. We are not going to show that our disease of mind has been the only cause of the decline of business. We are not about to demonstrate that imports have increased only slightly and that we have as much export trade as ever and that England and Germany have also a period of trade doldrums in place of trade winds. Rather, we are proposing to apply psychological truths, that is, facts relating to the mind, to the prosaic questions of coal-land values.

Certain worthy contributors and some enlightened national coal-land officials and a few of our leading experts have tried to base the values of coal lands on the laws of mathematics. As a matter of fact, when a man would buy a piece of land, he asks himself how much he has to spend and whether it will buy him what he seeks to purchase. Very rarely will he say, "A portion of what I desire to purchase sells for so much. If I am going to buy so many portions in so many years at so much per portion, what would be its equivalent now?" And thus it is that first cost of coal land is not based on probable royalties and in fact is usually far less than the present value of current royalty rates.

In fact, it is the allurement of small present expenditures which makes the well-to-do so willing to pay dime and quarter tips, the poor man so ready to buy a bucket of coal at $20-per-ton rates, and the London east-ender so indifferent to the cost of tea so long as he can buy a farthing's worth for his supper.

This readiness to pay in small installments and pay outrageous prices is the reason why pianos sell so readily much above their value and why also coal lands purchasable at $20 per acre have been known to draw the self-same year 10c. per ton royalty with a minimum output placed at 200,000 tons per annum.

And moreover, the rate of interest on which the present-day value is usually figured is so low that the average business man is not well pleased to accept it as a basis for his calculation. It is true in some cases that the coal man has his money in his business year after year without profit and in some years seems to be exchanging his good United States dollars for those of Mexican coinage, yet in his mind, when he buys, he is figuring on 10 or 20 per cent. interest on his money or he will turn the project coldly down. In fact, he will tell you that anyone who figures on 10 per cent. may earn perhaps 5, but if he estimates on 5 per cent., he may find himself without any profit whatever.

The whole basis of figuring from royalty values is wrong until you arrive at the condition when some rich estate of absolutely unquestioned value, having been acquired at a low figure, is held by some heirs of a speculator who are satisfied to get a steady income from the lands. Then, perhaps, it will be found that the royalty rate bears a favorable relation to the present-day selling cost, because the parties are not disposed to sell and regarding the coal as an investment, figure the interest at the rate bonds would bring.

But what the relation actually is between selling price and royalty is not a mathematical but a mental factor and depends not on the laws of interest, but on the personal equation which, to solve, demands a knowledge of human nature rather than of logarithms.

We are not opposed to mathematical calculations. They are excellent things, if people will make them; so are eugenic marriages. But as a matter of fact, few take such careful count, and purchase, like matrimony, has some of the elements of a lottery. If scientists must figure, why not estimate royalty from present value and not *vice-versa?*

When the Miners Celebrate

The celebration of our national holiday presented an opportunity for observing sociological conditions in the mining regions that seldom occurs. With the American warships maneuvering in Mexican waters and the stars and stripes floating over Vera Cruz, perhaps the event this year carried a particular significance. Certainly the true, full-blooded American entered more heartily into the spirit of the occasion and thought more seriously of patriotism and all the latent possibilities connected therewith at the present time.

But disregarding these aspects of the celebration, a study of the rank and file of the mining communities in their gala dress presents interesting food for thought. Especially is this so to the uninitiated public at large to whom the expression "mining camp" usually conveys the impression of a single straggling road, lined with dilapidated shacks, inhabited by a gun-fighting population.

On the contrary there were probably few sections of the country where the day was recognized with a greater patriotism and less disorder than in the coal-mining communities. And the casual observer at a mining village

could not fail to be impressed with the high general average of the men participating in the parades. It is true that the large majority carried the unmistakable stamp of foreign origin, ranging from the swarthy Italian to the fair-haired Pole. But it is equally true that some of these nationalities almost eclipsed the native Americans in their enthusiasm over the occasion.

For example one of the most impressive sections of the Summit Hill (Carbon County, Pennsylvania) celebration was a Slavish company caparisoned with scintillating helmets and brilliant uniforms that evoked spontaneous applause from the assembled throngs. In the ultimate analysis, it is upon these men that we must depend for the brawn and sinews to keep the wheels of our industries moving, and this hearty support and hopeful intent are most gratifying to observe.

A salient feature of the celebrations generally was the note of good living and general prosperity that pervades the districts. The paraders as a whole were a sturdy class, clear-eyed, generally quick witted and with an elastic step that comes only with clean, healthful living. Among the younger generation evidence of a moderate affluence was observed in the cut of their clothes, which was supplemented with a modest finery. Indeed in a "mining camp," the Fourth of July throws a new and interesting side light on the coal industry.

Selection of Mine Foremen

The members of the executive boards of the first, seventh and ninth districts of the United Mine Workers of America met in executive session on June 5 and passed a resolution against the certificating of men as mine foremen or assistants unless they have had experience as practical miners. It is not sufficient, in their belief, that they shall have worked in the mines the statutory period, but that they shall have dislodged and loaded coal for that period of time.

We can hardly blame the workingman for that stand For hundreds of years the educated classes have kept up their aristocratic domination by urging that only those who had spent so many years in college were fit or could be fit for employment in certain preferential occupations and offices. There was enough logic in the stand to make it appear plausible and men who had brains and education but not the mere residence in college were effectually excluded, and men who had neither brains nor real education but the required amount of residence received the emoluments and controlled the offices.

Which was all wrong, and so is the restriction of mine foremanship to miners. A fit man should not be excluded if he has the qualifications. A knowledge of mining is not only to be gotten at the end of the pick or the handle of the drill, though many a good thinker is loading coal. In fact, this desired restriction is class legislation in another shape.

Our consideration of the matter thus far has been based on the idea that the miner desires this restriction because he wants to reserve all the official jobs around the mines for himself, but as large an element we readily concede is the desire to have in authority men who are expected to be competent and considerate instead of men whose experience is different and whose sympathies are not with the men they control.

As far as competency is concerned, the mining operation will, from year to year, become more and more the work of machines, and increasingly will it be important for the men in authority to understand them. Nor do we believe that competency consists alone in knowing how things have been done in the past. The really competent man is the man who discovers a new way, and such men are quite frequently those whose line of work or even of life has been a trifle different to that pursued in the occupation of which they eventually come into control.

For instance, the complete stranger in pitching mines wonders at the loose way in which steep slopes are unguarded. He wonders if it is necessary to omit hand rails and ladderways in steep pitching breasts. The miner scoffs at these dangers and he knows they must continually be faced under normal conditions at the breast, and he has grown so calloused to them that he does not seek their removal where a remedy is simple and inexpensive. Now, while the mine foreman should certainly never be so ingenuous as a complete stranger, we believe that there are men who have worked five years around the mines who will see errors in mining methods that the miner will never see.

As to the matter of sympathy and solidarity, we think also that permitting other workingmen in the mines than miners to qualify for foreman is to be commended. There is no one so much in sympathy with the miner as the man who has never entered a mine. Those who have worked in them but have not done the laborious work are more prone to be thoughtful of the miner's difficulties and dangers than a miner himself.

Who is worse to work for than a man who, being told that there are six inches of water over the rail in a gangway which should be removed, responds with an oath that it was always that way in some place or other in the mines when he was digging coal. There are many workingmen in authority who can never forget how soon they went to work, how low some of the coal was, how long they waited for cars, how much water they had to wade, how murky was the air and how dangerous the place, and they take a sort of unholy delight in perpetuating the past and in pleading that such inconveniences and dangers are and ever must be a part of the business Whereas, put a man with a somewhat different line of experience in charge and all these things seem unnecessary.

In fact, it has been a surprise, and not altogether a pleasure, to see how the miner who has gotten into office as foreman or inspector will often be more considerate of corporation purses than the operator himself would be if he were put in the same place. "What has once been endured, can be endured again," is the complacent motto of many of such one-time miners.

Do not misunderstand our position in this matter. Mine foremen, of course, should have had much experience in the mine, but it is not by any means certain that the miner will be best cared for if all appointments are made from those of his own vocation.

It is estimated that the provision of electric cap lamps for the miners of the Pittsburgh district will cost the coal-producing companies $2,500,000. Alterations to the coal tipples of Ohio to enable the operators of that state to conform to the new anti-screen law will necessitate an outlay of $2,000,000. These two instances illustrate the enormous expense which is incurred by the industry in making the comparatively trivial changes which working conditions, agreements, or statutes render necessary.

Legal Department

When Is Coal Delivered to Buyer?

By A. L. H. Street*

SYNOPSIS—The New York Supreme Court, Mr. Justice Kruse dissenting, decides that the seller, and not the buyer, of coal must bear the loss which accidentally occurred while it was awaiting unloading.

The question whether the buyer or the seller of two boatloads of coal should bear loss arising while the boats were waiting to be unloaded, was involved in the case of Westmoreland Coal Co. vs. Syracuse Lighting Co., 145 *New York Supplement,* 420, which was recently before the Appellate Division of the New York Supreme Court, fourth department. It was decided that there had been no such delivery of the coal as to pass title to the buyer, and that, therefore, the loss fell on the seller.

Plaintiff sold defendant 50,000 tons of coal to be delivered "alongside" defendant's dock at Syracuse. The two boatloads involved in this suit approached to within 300 or 400 ft. of defendant's dock, which is on a canal, but they could not be docked and unloaded because two other boats then occupied the dock. Accordingly, to comply with rules governing traffic on the canal, the boats in question were moved by the carrier to the side of the canal opposite the dock to await their turn for unloading. Defendant was notified of the arrival of the boats, and entered them on its books as having arrived at the dock. Two hours later, a break occurred in the canal, and without any fault on the part of the plaintiff the boats and their cargoes were drawn into the break and lost. On these facts the Supreme Court held:

The Carrier as the Seller's Agent

"If the coal in question had not been in fact delivered to the defendant before it was lost, then the carrier still remained the agent of plaintiff for the purpose of making delivery of it under the contract. It is clear that the carrier's duty in making the delivery had not at that time ended. He still had to place the boats alongside defendant's dock. This he had not in fact done, though the boats at one time had approached within a few hundred feet of the dock. . . . Defendant was not responsible for this delay in laying the boats alongside the dock. . . . Plaintiff was fully advised before the contract was made that the capacity of the dock was limited, so that only two boats could be unloaded there at the same time." The court concludes that the carrier, in taking the boats to the side of the canal opposite the dock, was acting as the seller's, and not the buyer's, agent.

Entry of Arrival No Acceptance

According to the decision, the fact that defendant entered on its books the arrival of the boats does not show an acceptance of the coal by defendant; the entry being merely a concession to plaintiff's interest for the sole purpose of fixing a time from which subsequent possible claims of boat captains against plaintiff for demurrage could be corrected and verified.

Answering a contention made by plaintiff that when it placed the coal on the boats there was an appropriation of it in fulfillment *pro tanto* of the executory contract for delivery of coal, the court said:

"While this may have been an actual appropriation by plaintiff to that end, yet it did not complete what it had agreed to do before title passed to the defendant. . . . Delivery of the coal at the place specified in the contract was required to be made, and then only would the defendant's assent to such appropriation in part fulfillment of the contract be established."

Mr. Justice Kruse, presiding judge of the court, refused to concur with the holding reached by a majority of the justices constituting the court, and adhered to an opinion that title had passed to the buyer and that the loss must fall upon it. Judge Kruse said in part: "If there was an appropriation of the specific coal to the contract, assented to by the defendant after the coal reached Syracuse, as I think should be found as a fact from the evidence, the title passed to the defendant, and the loss must fall upon it. . . . Not only did the defendant know the precise time and place of arrival of the coal, but a record of the quantity, as well, was made by it."

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Recent Judicial Decisions

Injury to Miners in Washington Mines—A Washington mine operator is not liable for injury to a miner caused by failure of a fireboss to make tests for gas before firing shots; the boss being regarded as a fellow servant of the injured miner and not a representative of the operator. (United States Circuit Court of Appeals, Ninth Circuit; Pacific Coast Coal Co. vs. Brown; 211 Federal Reporter 869.)

Dangers Against Which Employer Need Not Warn—Although a mine operator owes a duty to his inexperienced employees to warn them against dangers of their work which are unknown to them, there is no obligation to warn against an obvious danger involved in the very nature of the work, as where employees are engaged in timbering a mine. (Illinois Supreme Court, Kalinski vs. Williamson County Coal Co., 104 Northeastern Reporter 1096.)

Consignee's Duty to Unload Shipment—When a car containing a single shipment of bulky freight is placed in a proper place for unloading there is a constructive delivery of the freight to the consignee, especially where the shipment is an interstate one and the railway company has filed with the Interstate Commerce Commission schedules containing a provision that the consignee shall do the unloading. (New York Court of Appeals, Lewis vs. New York, Ontario & Western Railway Company, 104 Northeastern Reporter 994.)

Removal of Coal Near Boundary Line—In view of the West Virginia Statute which prohibits removal of coal within 5 ft. of the line of an adjoining owner's land, a deed to coal underlying a tract described by metes and bounds, giving the purchaser "all the usual mining privileges for the removal of same and every part thereof" from the land, cannot be regarded as authorizing the purchaser to mine within 5 ft. of land retained by the seller. Each separate encroachment subjects the offender to a separate penalty under the law mentioned, and a coal company is liable for its employees' acts whether the officers of the company knew thereof or not. (West Virginia Supreme Court of Appeals, Darby vs. Davis Coal & Coke Co., 81 "Southeastern Reporter," 1124.

Discussion By Readers

How to Buy Coal

[In presenting the interesting inquiry of J. A. Flood, secretary of the Venango Manufacturing Co., Franklin, Penn., p. 39 of the last issue, we offered a few brief comments bearing, in a general way, on the selection of fuel for economic consumption, in the production of power. The remarks were not intended as an answer to the question asked, but to stimulate its discussion. We are glad to be able to publish the following able reply from an authority on the purchase of coal.—ED.]

Referring to the letter of the Venango Mfg. Co., COAL AGE, July 4, p. 39, concerning the price and value of coal based on analyses, permit me to say, in the first place, comments should be made upon the details of this letter and then approximate values can be given.

First. Regarding the analysis and price, given in the first paragraph, for coal to be delivered at $2.05 per ton. From our experience, this would seem an example of a far too common practice of certain coal producers, to take any form of analysis that may come to their hand and use it as representative of their coal. The analysis here shown represents one of the best grades of a highly volatile coking coal and one that would carry with it a quick-sale price, of at least $1.60 per ton, f.o.b. mines, which with a standard freight rate of $1.55, would make the coal, delivered, worth $3.15 per ton.

Second. This coal, used for steam purposes, is a very expensive type of coal. Being a gas coal, high in volatile matter, it would take its place, in sale, with a higher priced gas coal; and, because of its high volatile matter, would be an uneconomical steam producer.

Third. The two analyses made of coal delivered, represent two entirely different coals. Neither one is of the type quoted upon, as shown by the first analysis. It is unnecessary to comment here, in detail, upon these two analyses of deliveries; their value will be shown later. Because of a few minor troubles, such as low evaporation, plenty of shoveling of coal, loss of grate bars, etc., these deliveries would probably cause the loss of all the help in the boiler room, especially in the case of the Car No. 72,494. It would have been economy to have paid for the coal and dumped it in the nearest river.

Fourth. The analysis, given of the Pittsburgh-district coal, costing $2.40 per net ton, delivered, represents, in a way, this type of coal, which also is a highly volatile coking coal. It is not possible to use this analysis in comparison with the other, for the reason that the B.t.u. value of 13,480 is altogether out of proportion for this type of coal, in comparison with the remainder of the analysis. There must be an error in the analysis, or a weathered or extraordinary sample was taken to obtain such results. A normal heat value for such a coal, upon the basis of 1.70 per cent. moisture, would be about 14,150 B.t.u.

Fifth. Now, as to the commercial values of the deliveries of the two cars of coal mentioned, as compared with the quotation of $2.05 per net ton upon the first analysis, comparison may be made in many different ways. We choose, in this case, to compare values by an average of the usual amount of debit and credit, as applied to coal deliveries by corporations buying on specifications. We will use, in this regard, a basis of 2c. deduction per unit (1 per cent.) of ash; 2c. deduction per unit of B.t.u. (100 B.t.u.); and 2c. per unit (½ per cent.) of sulphur. Upon this basis, the value of the delivery representing car No. 62,462, as compared with a price of $2.05 per net ton upon the submitted analysis, will show a value of $1.66 per ton for this coal delivery, with these debits applied. In the case of car No. 72,494, in the same way, the value will be $1.01 per ton. This will show the comparative values of the two deliveries.

Sixth. In order to arrive at another comparison of the relative values of these coals from their analyses, we may reduce them all to a uniform basis of "dry B.t.u." For example:

Analysis No. 1, 14,510 B.t.u. reduced to dry basis, is 14,605 B.t.u.

Analysis No. 2, 13,347 B.t.u. reduced to dry basis, is 13,510 B.t.u.

Analysis No. 3, 11,760 B.t.u. reduced to dry basis, is 11,866 B.t.u.

Analysis No. 4 (corrected), 14,150 B.t.u. reduced to dry basis, is 14,400 B.t.u.

A 100-hp. boiler evaporates in one year (300 days) approximately 9,000,000 lb. of water (30,000 lb. per day). If, from the above dry B.t.u. values, we calculate the evaporation, by dividing the dry B.t.u. by 965 and taking 70 per cent. of such value, as representing the comparative value between the theoretical and practical evaporation factors, or the actual pounds of water evaporated by one pound of coal, assuming a 100-hp. boiler, we find as follows for the amount of each coal that would be used in a year:

Analysis No. 1, 14,605 B.t.u. gives an evaporation factor of 10.60 lb., which shows a requirement of 425 tons of coal for the year, at a price of $2.05 per ton, with a net cost of $871.25.

Analysis No. 2, 13,510 B.t.u. gives evaporation of 9.8 lb., which shows a requirement of 454 tons of coal for the year, at a price of $2.05 per ton, with a net cost of $930.70.

Analysis No. 3, 11,866 B.t.u. gives evaporation of 8.50 lb., which shows a requirement of 529 tons of coal for the year, at a price of $2.05 per ton, with a net cost of $1058.82.

Analysis No. 4, 14,400 B.t.u. gives evaporation of 10.44 lb., which shows a requirement of 431 tons of coal for the year, at a price of $2.40 per ton, with a net cost of $1034.40.

The above comparative figures do not include the relative difference of cost of removal of ashes (local cost reckoned at 20c. per ton) and the effect of lost grate bars, a considerable factor in the case of coal No. 3, Car No. 72,494.

F. P. HARRIS, The Harris Laboratory.
New York City.

The "Safety-First" Call

Letter No. 3—In view of the fact that the larger proportion of our mining population is composed of Latin Europeans, fresh from the feudal agricultural districts of southern Europe, and totally unacquainted with the hazardous nature of the industry in which they engage, the question of properly safeguarding this class has been, is and will continue to be one of serious consideration and vital importance to the people of this country, in both its humanitarian and sociological aspects.

In the solution of this problem, in many cases, the physical man alone is generally considered. While the preservation of life is absolutely necessary, it frequently happens that the misapplication of principles and the injudicious adoption of unsuitable means to this end, make practically impossible the accomplishment of the desired result. No individual can attain to the full dignity of the higher physical, mental and moral development while he is surrounded by conditions that render impossible the full and free exercise of his faculties.

In striving to educate the class of labor that is coming in such large numbers to this country, regard must be had to the conditions that surrounded them at home. The majority of these people are the product of centuries of mental and moral misrule. Their mode of life has been regulated very largely by the law of class distinctions; their mental attainments are proscribed by ignorance and superstition. Their knowledge of civil and moral law is confined to the breach, rather than to the observance of the law. A violation of law is to them *justifiable,* while being caught in the act is *criminal.* In a sense, they are automatons.

Such, in brief, is the raw material that the American mine official must convert into a finished workman. Additional safeguards will not accomplish this end, but will rather perpetuate the ignorance and superstition of their darkened minds. The first requisite to regenerate such a class and give to such men an impetus toward self-improvement is to cause them to feel their individual responsibility for their own safety and that of their fellows. Self-preservation, which is the first law of nature, is supposed to be intuitive; but its recognition as a law, by the individual, involves a sense of responsibility.

And, here, it will be well to recognize a broad principle that any form of safeguarding that goes further than to impart the necessary instruction and to enforce the observance of the mining law and mine regulations by every worker, operates to curtail the sense of individual responsibility and retards the accomplishment of the desired end.

Following this line of action, the foreign workman should be given all possible instructions how to perform his work with safety to himself and others. He should be made fully acquainted with the mining law and mine regulations, and made to understand the danger of violating the same. A strict surveillance should then be kept of the workers, in order to maintain the firmest discipline throughout the mine.

In closing, permit me to emphasize my belief that it is the failure to recognize the absolute need for individual responsibility that suggests a necessity for additional safeguards, which, with proper discipline, should not be required. Perhaps, the chief characteristic of the average foreign worker is a bland, simple and childlike dependence that veils a stategic cunning that is inbred in their nature. This foreign trait too often imposes upon the credulous American mine official, who fails to deal out justice to the foreigner for a violation of law, in the same measure that he would to another worker. Greater safety would prevail in every mine if this feature were more broadly recognized.

T. C. PARFITT.

Jerome, Penn.

Working Coal Seam with Heavy Parting

Letter No. 3—The inquiry on p. 981, June 13, asking if it would be practicable or profitable to work a 5-ft. seam of coal, having a parting in the middle of the seam varying from 6 to 18 in. in thickness, calls to mind an experience I had in working a similar seam in South Wales, some years ago. Although the conditions, in that case, were not as favorable as those described in this inquiry, we were able to work the seam at a profit. In our case there were 18 in. of bottom coal and 2 ft. of top coal, separated by 26 in. of a stone parting. The longwall method was employed in working this seam.

At first, the bottom coal was worked out and the stone spragged. Then, the stone was taken down and after cleaning up the refuse the top bench of coal was dropped. This method proved dangerous, however, many accidents resulting from the fall of stone and coal while mining the lower bench of the seam. On this account, a change was made and the top bench of coal mined first, the stone being then taken out and the bottom bench mined last. The top bench of coal was thus kept about 3 ft. in advance of the bottom coal. This was a great improvement and I do not remember that any accidents occurred after making the change. I believe the same method could be employed in the present case.

My reasons for advising the adoption of the longwall method of mining is that a larger output of coal is produced and the ventilation is kept up to the face, whereby the sanitary condition of the mine is greatly improved. An important feature favoring the use of the longwall method is the fact that no explosives are required for blasting the coal and the latter is obtained in better condition, less fine coal and slack being produced. The mining can be done either by pick or machine, in the parting just below the top bench of coal. The weight of the roof will break the top coal, and this is taken out first. The tendency of the bottom to heave may be sufficient to loosen the remaining portion of the stone; but, if not, a light shot can be placed in the stone above the bottom bench of coal. After the stone is removed and the refuse cleaned up, the lower bench of coal is lifted.

In opening a mine in such a seam as is described in this inquiry, I would adopt the room-and-entry system at first, until I had secured the first weighting of the roof; then I would cut across the pillars at the face and lay a face track, 300 ft. in length, between roadways. I believe this method would prove the most economical one to adopt, as it would eliminate the question of yardage in driving the entries and produce the largest output of coal, at a minimum of cost for haulage and material.

W. JAMES, Mine Foreman.

Mystic, Iowa.

A Longwall Proposition

Letter No. 5—In reply to the inquiry of Mr. Hartsuff, COAL AGE, June 6, p. 944, permit me to say that I consider the conditions he describes as ideal conditions for the adoption of the longwall method of mining. Many years of experience and observation in this class of work leads me to favor its adoption under conditions similar to these.

I recall an instance of a mine having a very hard roof and worked on the *room-and-pillar* system. Great difficulty was encountered by the heaving of the floor. Very often during the working hours, the floor would heave to such an extent on the main-haulage road, that the cars would catch the roof and the haulage of coal had to cease until the trouble could be remedied by lifting bottom. As this happened frequently, it can be well imagined what an item of expense this proved.

The same mine was eventually operated on the *longwall* system with great success. It was found, in this system, that the roof settled firmly on the gobs and packs, so that roof and floor practically came together. I feel certain that the same good results would be obtained in Mr. Hartsuff's case, especially as he states that the bottom heaves slowly in narrow work.

In this connection, allow me to refer to my article on Starting Longwall in Room-and-Pillar Work, COAL AGE, Apr. 25, p. 697, which gives information on the building of packwalls in longwall mining. The cost of shooting down the roof and building the packs should be about $1 per ft. of thickness, per lineal yard. The cost may slightly exceed this when back ripping must be done to keep the roads open, as it will then cost a little more to haul the dirt away and pack it in the gob.

The method of working any seam naturally depends on the local conditions in the mine. Speaking generally, however, the system of mining adopted will be determined largely by the thickness of the coal and nature of the roof, floor and coal. Seams not exceeding 4 ft. in thickness are the best adapted for longwall work because it is possible to build good, solid packs to this height. Longwall work in thicker seams is generally more dangerous because of frequent fal.. of roof and sides, owing to the insecurity of the packwalls and the lack of a proper amount of stowage. The expense for timber is also greater in thick seams.

To obtain the greatest advantage in longwall work, there must be: A fairly good yielding roof; a moderate thickness of seam; little or no inclination; a coal of moderate hardness; and freedom from slips and other faults and water in the strata.

HARRY MARSON.

Piney Fork, Ohio.

Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

Unequal Splits—To illustrate the formulas used in the calculation of the natural division of an air current between two or more airways and the pressure and power on the air, assume a current of 75,000 cu.ft. per min. is passing in the following three splits, starting from the same point of the main airway or at or near the intake opening. The lengths given for the several splits include the return, in each case; and the pressure and power are for the circulation in the splits only.

Split A, 6×10 *ft.*, 2000 *ft. long*; $a = 60$ *sq.ft.*; $o = 32$ *ft.*; $l = 2000$ *ft.*
Split B, 6×8 *ft.*, 1500 *ft. long*; $a = 48$ *sq.ft.*; $o = 28$ *ft.*; $l = 1500$ *ft.*
Split C, 4×12 *ft.*, 2500 *ft. long*; $a = 48$ *sq.ft.*; $o = 32$ *ft.*; $l = 2500$ *ft.*

The lowest relative values are as follows: Areas, 5, 4, 4; perimeters, 8, 7, 8; lengths, 4, 3, 5.

Relative split pressure potentials, $X_p = a\sqrt{\frac{a}{lo}}$; $X_{pa} = 5\sqrt{\frac{5}{4 \times 8}} = 5\sqrt{0.1562} = 1.976$

$X_{pb} = 4\sqrt{\frac{4}{3 \times 7}} = 4\sqrt{0.1905} = 1.746$

$X_{pc} = 4\sqrt{\frac{4}{5 \times 8}} = 4\sqrt{0.1000} = 1.265$

Sum of potentials, ΣX_p 4.987

Natural division of air current, $q_a = \frac{X_a}{\Sigma X_p} Q$; $q_a = \frac{1.976}{4.987} \times 75{,}000 = 29{,}720$ *cu.ft.*

$q_b = \frac{1.746}{4.987} \times 75{,}000 = 26{,}260$ *cu.ft.*

$q_c = \frac{1.265}{4.987} \times 75{,}000 = 19{,}020$ *cu.ft.*

Total circulation, Q ..... 75,000 *cu.ft.*

To calculate the pressure and power of the circulation, it is necessary to employ the part-potential values, instead of the relative values; thus,

Part potential values, $X_p = a\sqrt{\frac{a}{lo}}$ $X_{pa} = 60\sqrt{\frac{60}{2000 \times 32}} = 1.837$

$X_{pb} = 48\sqrt{\frac{48}{1500 \times 28}} = 1.623$

$X_{pc} = 48\sqrt{\frac{48}{2500 \times 32}} = 1.176$

General part potential for splits, ΣX_{po} 4.636

Pressure, $p = \frac{kQ^2}{(\Sigma X_p)^2} = k\left(\frac{Q}{\Sigma X_p}\right)^2$ $p = 0.00000002\left(\frac{75{,}000}{4.636}\right)^2$

$= 5.2$ *lb. per sq.ft.* (1 *in. w.g.*)

Horsepower on the air, $H = \frac{kQ^3}{33{,}000\ (\Sigma X_p)^2}$ $H = \frac{0.00000002 \times 75{,}000^3}{33{,}000 \times 4.636^2}$

$= 11.9$ *hp.*

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Secondary Splits—Primary splits are best indicated by the large letters, as Splits A, B, C, etc. Secondary splits are named after the primaries in which they occur; thus A_1, A_2, etc., or B_1, B_2, etc.

The corresponding split potentials are indicated thus:

Primary potentials, X_a, X_b, X_c, etc.
Secondary potentials, X_{a1}, X_{a2}; X_{b1} X_{b2};; X_{c1} X_{c2}; etc.
General split potentials, X_{ao}, X_{bo}, X_{co}
General mine potentials, X_o

To illustrate the calculation of the effect of making a secondary split in the above mine, assume the air is again split in C, at a point 500 ft. inby from the main or primary split.

Splits A and B are the same as before, while Split C is now 500 ft. long; Split C_1, 1200 ft. long; and Split C_2, 800 ft. long. The part potential values for the splits are, then,

Split A, $X_p = a\sqrt{\frac{a}{lo}}$ X_a (*as before*) = 1.837

Split B, X_b (*as before*) = 1.623

Split C, $X_c = 48\sqrt{\frac{48}{500 \times 32}} = 2.629$

Split C_1, $X_{c1} = 48\sqrt{\frac{48}{1200 \times 32}} = 1.697$

Split C_2, $X_{c2} = 48\sqrt{\frac{48}{800 \times 32}} = 2.078$

General split potential, $\Sigma X_c = 1.697 + 2.078 = 3.775$

Combining this general potential for Splits C_1 and C_2, with the potential for Split C, in tandem, we have,

Part potential values, (*Tandem circulation*) $\frac{1}{X_c^2} = \frac{1}{2.629^2} = 0.1447$

$\frac{1}{(\Sigma X_c^2)} = \frac{1}{3.775^2} = 0.0702$

Tandem value, $\Sigma\ (1 / X_{co}^2)$ 0.2149

General part potential, (*Primary split C*) $X_{co} = \frac{1}{\sqrt{0.2149}} = 2.157$

Part potential, Split A, X_a = 1.837
Part potential, Split B, X_b = 1.623
Mine pressure potential, X_{po} 5.617

Mine power potential, (*After splitting*) $X_{u2} = \sqrt[3]{5.617^2} = 3.160$
Mine power potential, (*Before splitting*) $X_{u1} = \sqrt[3]{4.636^2} = 2.780$

For a constant power, the quantity ratio is equal to the power-potential ratio; thus,

$\frac{Q_2}{Q_1} = \frac{X_{u2}}{X_{u1}}$; $\frac{Q_2}{75{,}000} = \frac{3.16}{2.78}$; $Q_2 = \frac{75{,}000 \times 3.16}{2.78} = 85{,}240$ *cu.ft. per min.*

Mine pressure, $p = k\left(\frac{Q}{X_p}\right)^2 = 0.00000002\left(\frac{85{,}240}{5.617}\right)^2 = 4.6$ *lb. per sq.ft.*

Power on the air, $u = k\left(\frac{Q}{X_u}\right)^3 = 0.00000003\left(\frac{85{,}240}{3.16}\right)^3 = 11.9$ *hp.*

Inquiries of General Interest

A Coking Question

I would very much appreciate an answer to the question, Can an oven bottom be made too hot when coking coal, and how will this affect the quality of the coke produced?

J. T. MULLEN,

Chestnut Ridge, Penn.

In response to the above question submitted to him, J. R. Campbell, chief chemist, H. C. Frick Coke Co., very kindly sends the following interesting reply.

Referring to your recent communication, permit me to say that I would not like to answer the question, "Can an oven bottom be made too hot to make good coke?", categorically, as by so doing one might easily be led into a controversy. In the genuine beehive oven, the coking process is naturally downward toward the bottom of the oven, in order to produce coke having no cleavage. But, shutting off the draft by closing the dampers in the doors and covering the trunnel-head and allowing the oven to stand thus for several hours, the bottom of the oven may be made hot enough to start coking upward. A cleavage would then result in the coking mass some distance above the bottom, similar to what occurs in the byproduct oven, which, however, is not objectionable as long as the bottom bench is A No. 1 coke. In some instances, the same result is produced by means of flues. In my opinion, coking upward from the bottom of beehive ovens would not always be productive of the best results, as the ends of the coke would be apt to be charred and spongy.

J. R. CAMPBELL.

Everson, Penn.

Study Question--Acceleration of Load in Hoisting

A former examination question answered in COAL AGE some time ago (Vol. 4, p. 357), gave the unbalanced load hoisted in a shaft, including frictional resistance, as 4550 lb., which was the load on the engine. The ascending load, including the weight of the coal, car, cage and friction, was 7700 lb.

Some of us would appreciate a fuller discussion of this problem, showing the method of calculating the acceleration of the load when hoisting. In other words, when starting the loaded cage from the bottom, through what height would it ascend before attaining the full velocity of the hoist (20 ft. per sec.); and, again, at what distance from the upper landing would the engineer close the throttle, so that the ascending loaded cage may come to rest naturally, just above the "keeps?" This is, of course, a purely theoretical question; but it draws attention to the fact that the best engineers, who make the easiest landings, learn the point when to shut off the steam so as to land the cage easily on the "keeps," assuming the ropes are even.

S. A. DRIVER, Supt.,
Sibley Bros. Coal Co.

Warrior, Ala.

Hoisting, in a double-compartment shaft or a balanced hoist, is similar to the operation of the well known Atwoods gravity machine of physics, used for determining the force of gravity by experiment. In this case, the accelerating force is the difference between the descending and ascending loads, or the load on the engine (4550 lb.), while the entire mass accelerated is represented by the sum of these loads. When the loaded cage is at the bottom of the shaft, the weight of the rope hanging in the shaft (640 lb.) must be added to the ascending loaded cage, making the total ascending load 7700 + 640 = 8340 lb. The load on the engine being 4550 lb., the effective descending load is 8340 — 4550 = 3790 lb., and the sum of the two loads is then 8340 + 3790 = 12,130 lb. The acceleration (f), under these conditions, is

$$f = \frac{4550}{12{,}130} \times 32.16 = 12.06 \textit{ ft. per sec.}$$

The height above the landing at which the ascending loaded cage would attain the full velocity of 20 ft. per sec., is, then,

$$h = \frac{20^2}{2 \times 12.06} = 16.5 \textit{ ft.}$$

When the loaded cage arrives near the top of the shaft, the weight of the rope has been transferred from the ascending side to the descending side, making the ascending load, 7700 lb. and the descending load, 4430 lb. The difference between these two loads, or the accelerating force, is now 3270 lb., while the weight accelerated remains unchanged. The calculation is the same as before, the acceleration being 8.67 ft. per sec.; and the height below the upper landing at which steam should be shut off is then 23.07 ft.

Mining Coal with Heavy Parting

Referring to my previous inquiry, in this regard, COAL AGE, June 13, p. 981, the point I am particularly anxious to ascertain is what will be the probable difference in the cost per ton of producing coal, when workng a seam of clean coal, 4½ to 5 ft. in thickness, as compared with the seam previously mentioned, consisting of two 30-in. benches of coal separated by a dirt parting varying from 6 to 18 in. in thickness. Further, cannot coal be produced as cheaply or even more so, in the working of a 5-ft. seam containing 12 or 14 in. of parting, than in the working of a thin seam from 2½ to 3 ft. in thickness, other conditions of roof, floor and overburden being the same in each case?

FRED MORCK.

Warren, Penn.

In attempting to answer this question, it must be considered whether the extra coal in the 5-ft. seam with a 12- or 14-in. parting will pay for the handling of the dead material in the parting. In most cases, this question would be answered in the affirmative. In actual practice, much will depend on whether the dirt in the parting can be separated readily from the coal and whether it can be mined or if it will require to be blasted from the seam. These practical conditions always determine the question of economical mining. We shall be glad to have the question fully discussed as it has an important bearing on the mining of many seams in different coal fields.

Examination Questions

Mine Managers' Examination Held at Springfield, Ill., June 15, 1914

(Continued from last issue)

Ques.—The distance between a pair of cross-entries is 500 ft.; from the main entry to the boundary line is 1000 ft.; the thickness of the seam is 6.5 ft.; and the loss or wastage, in slack and dirt, is 15 per cent. The specific gravity of the whole seam is 1.3. Estimate the tonnage of coal that can be mined from this block, if 25 per cent. of the coal is left for pillars.

Ans.—The coal having a specific gravity of 1.3 weighs in the solid $62.5 \times 1.3 = 81.25$ lb. per cu.ft. The number of cubic feet of solid coal per ton is, therefore, $2000 \div 81.25 = 24.6$ cu.ft. Allowing 15 per cent. for loss in mining and 25 per cent. for pillar coal not to be taken out, the coal mined is $100 - (15 + 25) = 60$ per cent. of the capacity of the seam. The cubic capacity of the coal mined is, therefore, $0.60\ (500 \times 1000 \times 6.5) = 1{,}950{,}000$. Under the assumed conditions, therefore, this volume of coal represents a tonnage of $1{,}950{,}000 \div 24.6 = 79{,}269$ tons; or, say 80,000 tons.

Ques.—With a fan 8 ft. in diameter, making 250 r.p.m. and passing 62,000 cu.ft. of air per min., if the water gage reads 1 in., what is the equivalent orifice of the mine?

Ans.—The term "equivalent orifice" is antiquated, and the question is, further, somewhat misleading in giving the diameter and speed of the fan, as these factors do not enter into what has been understod as the equivalent orifice of the mine, which is

$$\textit{Equivalent orifice} = \frac{0.0004 \times 62{,}000}{\sqrt{1}} = 24.8\ \textit{sq.ft.}$$

As applied to the fan, this term is a misnomer, for the reason that fan calculations are all made on a basis of power. A centrifugal fan has no fixed ratio of water gage to quantity, which depends on the mine resistance.

Ques.—A tank measures 3x4 ft. and is 2 ft. deep; it is made of ½-in. boiler plate. If placed in water, how deep would this tank sink?

Ans.—The superficial surface of the bottom of the tank is $3 \times 4 = 12$ sq.ft.; and that of the sides, $2 \times 2\ (3 + 4) = 28$ sq.ft., making the total superficial area of the tank $12 + 28 = 40$ sq.ft. Allowing 10 lb. per sq.ft. for each ¼ in. of thickness of the boiler plate, the weight, in this case, is 20 lb. per sq.ft. of surface, which gives for the total weight of the boiler plate $20 \times 40 = 800$ lb. To this must be added, say 10 per cent. to allow for the additional weight of laps and rivet heads at the joints, making the total weight of the tank, say 880 lb.

The depth to which this tank will sink is determined by the volume of an equal weight of water which it displaces. The volume of this water is $800 \div 62.5 = 14.08$ cu.ft. The area of the bottom being 12 sq.ft., the depth to which the tank will sink is $14.08 \div 12 = 1.173$ ft., or, say 14 in.

Ques.—A tank measures 4x4 ft. and is 5 ft. deep; when placed in water, it sinks 9 in. What is the weight of the tank?

Ans.—The depth of the tank (5 ft.) does not enter this calculation. The area of the bottom of the tank is $4 \times 4 = 16$ sq.ft. Since 9 in. is ¾ ft., the volume of water displaced is $¾ \times 16 = 12$ cu.ft. The weight of this water, which is also the weight of the tank, is, then, $12 \times 62.5 = 750$ lb.

Ques.—If a seam of coal rising 1 in 8 meets an upthrow fault 12 ft. high, how far back would a tunnel rising 1 in 5 require to be started in order to reach the coal at the top of the fault?

Ans.—Assuming the rise in each case is based on horizontal measurement, and that the upthrow fault is vertical, and calling the required distance back for starting the tunnel to meet the seam beyond the fault, x; since the rise of the seam is 1:8, its total rise in this distance is $x/8$. Likewise, the total rise of the tunnel in the same distance is $x/5$. The difference between these two rises or the amount of upthrow being 12 ft.,

$$\frac{x}{5} - \frac{x}{8} = 12$$

$$8x - 5x = 40 \times 12 = 480$$

$$3x = 480;\quad x = 160\ \textit{ft.}$$

The tunnel must therefore be started back 160 ft.

Ques.—Two shafts are on the same surface level and each is 300 ft deep. The water gage at the bottom of the upcast shaft reads 29 in. What will it read at the bottom of the downcast?

Ans.—This is an unintelligible question. The given reading (29 in.) may refer to the reading of the *barometer* at the bottom of the upcast shaft, instead of a "water-gage" reading, as stated. It would be impossible, however, to tell what the reading of the barometer would be at the bottom of the downcast shaft, without knowing the reading of the water gage, due to the mine resistance. This water-gage reading has evidently been omitted from the question. However, assuming, for sake of convenience, that the water-gage reading is, say 2.72 in.; since mercury is 13.6 times as heavy as water, the corresponding difference in barometer readings, due to the mine resistance, would be $2.72 \div 13.6 = 0.2$ in. In this case, the reading of the barometer at the bottom of the downcast shaft would be greater than that at the bottom of the upcast shaft by 0.2 in.; or the reading at the downcast shaft would be 29.2 in., under these conditions.

Ques.—The depression produced by a fan is equal to a 1-in. water-gage, and the fan is consuming 10.4 hp. If the efficiency of the fan is 60 per cent., how many cubic feet of air is the fan producing?

Ans.—The efficiency of the fan being 60 per cent., the power on the air, in this case, is $0.60(10.4 \times 33{,}000) = 205{,}920$ ft.-lb. per min. Since 1 in. of water-gage corresponds to 5.2 lb. per sq.ft., the quantity of air in circulation is $205{,}920 \div 5.2 = 39{,}600$ cu.ft. per min.

Coal and Coke News

Harrisburg, Penn.

Bills for the state tax of 2½ per cent. ad valorem on the anthracite coal prepared for market were mailed by the auditor-general to 110 coal companies of the state on July 1. The bills will run close to $2,300,000, and the companies will have the usual period in which to pay or appeal to the courts.

The bills are for the tax on the output for 1913, being calculated on the reports filed by the companies. The sending of the bills is independent of the action now pending in court to test the constitutionality of the act, on which briefs were recently submitted by a number of companies and by the attorney-general.

What Is a Miner?

An answer to the mandamus proceedings brought to prevent issuance of certificates as mine formen or assistants to miners who, it is claimed, did not have five years' experience cutting coal will be filed in the Dauphin County Court at an early date, and in all probability the case will be argued before the end of the summer. The action was brought by the United Mine Workers of the Schuylkill region and raises an interesting question of what constitutes experience as a miner. The preparation of the state's side of the case has been delayed by the illness of Chief of Mines James E. Roderick, whose department will be represented by Deputy Attorney-General J. E. B. Cunningham.

Miners throughout the state are paying particular attention to this mandamus proceeding, as the chief of the Department of Mines holds that five years' experience in mining does not necessarily mean five years' actual work at the face, cutting coal. The miners' attorneys contend that miners must work five years at the face. The decision will affect hundreds of miners and may have an important bearing on the miners' certificate law, as well as on the bituminous miners.

Some Railroad Rates

The Public Service Commission has granted permission to trunk line carriers to postpone until Oct. 29 the tariffs previously issued by them providing for charges for so-called spotting service performed by such carriers. The tariffs were originally issued to become effective May 27, but by permission of the commission were postponed until July 1, and are by this latter action again postponed until Oct. 29, to which date such issues were postponed by the Interstate Commerce Commission. This has the result of delaying until Oct. 29 any attempt on the part of the carriers to enforce charges for spotting on either interstate or intrastate traffic.

The Pennsylvania R.R. on July 3 filed with the Public Service Commission a joint answer in behalf of the Northern Central, Philadelphia, Baltimore & Washington, Cherry Tree, Dixsonville & Monongahela railroad companies that the rates complained of by the Spreckels Sugar Refining Co. on coal consigned to Philadelphia for harbor delivery have been canceled and wants the complaint dismissed.

High Production Last Month

The production of anthracite coal last month was larger than that of June, 1913, and the official figures of the Bureau of Anthracite Statistics, which will be issued in a short time, will show shipments of over 6,000,000 tons. All of the principal companies, except one or two, report an output equal to or greater than the corresponding month last year. The Lehigh Valley Coal Co. expects that its final figures for the month will show 900,000 tons mined, which will be its high record for any one month. In May, 1911, it mined 800,668 tons, and in March, 1912, it produced 814,679 tons.

At the beginning of last month production as a whole was about 2,000,000 tons behind that of last year, but the summer discounts are proving attractive, and the consumers seem to have learned the wisdom of buying coal when coal is cheap. According to statistics recently compiled, 50.3 per cent. of the total shipments were sent out during the winter months last year, and 49.7 per cent. in the summer months, the difference betwen winter and summer shipments being less than 350,000 tons.

The labor situation in the anthracite fields is quiet, though there have been a few "button" strikes here and there, and complaints are heard from many of the operators about agitators trying to stir up trouble among the mine workers, who are glad of the increase in the number of working days during the summer months. From 1892 to 1901, the average time worked in the anthracite region was 179 days. Since the summer discount went into effect in 1902, in only one year, 1906, when there was a long suspension, has the number of days worked fallen below 200. In 1913 it was 257 days.

PENNSYLVANIA

Anthracite

Thropp—The union miners of this community are protesting against the making of motion-picture films depicting strike scenes. The men believe that these pictures will cause an unfavorable attitude toward the miners in places where they are not known. A moving picture company has been making the film for some weeks.

Plymouth—Operations at the breaker of the Parrish colliery of the Lehigh & Wilkes-Barre Coal Co. were suspended July 1. The colliery will remain idle for three months, after which time the output will be prepared for market at the new Buttonwood breaker at Breslau. About 100 men were employed in and about the breaker and the majority of them will be obliged to seek work elsewhere.

Ashland—A daring attempt to dynamite a Lehigh Valley pay train with $50,000 aboard was frustrated on June 30 by huckleberry pickers near Ormrod. The berrypickers discovered that the tracks had been blown up, ran eastward and flagged the train, which they knew was to arrive at Centralia to pay the employees of Centralia and Continental collieries.

Girardville—A 15-year lease between the Girard estate of Philadelphia and the W. R. McTurk Colliery Co. for the colliery at Girardville was placed on record in Schuylkill County recently. The lease runs until Dec. 31, 1928, and calls for the taking over of coal lands in the township of Butler and the borough of Girardville.

Glen Lyon—A large mule barn of the Susquehanna Coal Co. was entirely destroyed by fire on July 1, together with a large quantity of grain, hay and straw. The barn was a large one and represents a loss of about $17,000. The structure, which was about 50 ft. in width and 200 ft. in length, was of wood with a slate roof.

Hanover—There was excitement at No. 21 colliery of the Lehigh & Wilkes-Barre Coal Co. recently, when the headhouse of the air shaft was discovered on fire. The employees soon had a stream of water on the blaze, but were handicaped by lack of water pressure. The blaze was extinguished before much damage was done.

Bituminous

Glendale—Fire which broke out in the Glendale mine of the Pittsburgh Coal Co. on July 5 was extinguished the following day. The blaze started from an electric wire in one of the shafts. Men returning to the shaft shortly after noon found smoke curling from the entrance. The miners worked in relays finally extinguishing the blaze.

Cyrilla—The auction sale of Cyrilla No. 5 plant of the Sunshine Coal & Coke Co. has again been postponed until Sept. 12. This action has been taken after a second failure to receive satisfactory bids.

Charleroi—Poor shipping conditions on the Ohio River are given as the reason for the closing down of a number of coal mines along the third and fourth pools of the Monongahela River Consolidated Coal & Coke Co. and other firms. Practically all available barges have been filled and shipped to Pittsburgh to await such time as they may be shipped elsewhere. The remaining barges are on the Ohio tied up at storage places.

Rockwood—A test hole was completed on June 20 on the Barkman farm by Lewis brothers, who are operators and owners of a large mine at Hooversville. They have under option 3100 acres, the majority of which is in Milford township, underlying the farms of Jacob Barkman, Harvey Myers and Peter Koontz. The test hole was driven 300 ft. and

passed through two seams of excellent coal, specimens of which are now in the laboratory of a chemist for analysis. If the coal is of good quality, development of the field will begin at once.

Windber—Through the efforts of the Berwind-White Coal Mining Co., which offered prizes for the best kept premises, for flower beds and for lawns, the town of Windber is putting on a handsome appearance, hitherto unknown to the coal-digging suburb. The smart and well-kept miners' homes are attracting much favorable attention in neighboring communities.

Bentleyville—One of the largest new coal mining operations in the immediate Pittsburgh district in some years is being developed in Washington County, where the Pittsburgh-Youghiogheny Coal Co. is sinking a shaft and will shortly open a new mine that will employ over 450 miners and will have a daily output of approximately 3000 tons of coal. The mine is located in what is called the Van Voorhis district and the company has 1000 acres of coal land there to work.

Carroltown—The Carroltown mine of the Ebensburg Coal Co. is to be disposed of within a short time to the Carroltown Coal Co., according to reliable reports. The Carroltown mine is known as Nanty-Glo No. 2 and is one of the best openings in the northern end of Cambria County. The coal is the quality that seems to be always in demand. The Carroltown Coal Co. is also negotiating for the purchase of the Candy mine, near Spangler.

Monongahela City—Considerable uneasiness prevails over the Monongahela Valley mining district, as the result of various coal companies closing down on July 4 twelve mines, throwing out of employment from 3500 to 5000 men. It was announced that the mines would not be reopened for at least two months. The cause given for the layoff is that all the available barges are full and ready to be towed south. With this superabundance of fuel, it was stated, further mining is not necessary. The output of June was extremely low in all the mines along the valley compared with the usual tonnage.

Colver—An unusually heavy production of coal was recently made from mine No. 1 of the Ebensburg Coal Co. The output for June exceeded 92,000 tons and the officials and employees are highly pleased at this showing.

WEST VIRGINA

Charleston—Over 7000 men in the Kanawha district, idle since June 1, following a strike over the terms of the new wage agreement, have returned to work as a result of a favorable vote on a proposition submitted by the operators. The men will work under a limited check-off system, pending the adjustment of the wage scale by a board of arbitrators to be chosen by the two sides and the Secretary of Labor. It is understod that the wage scale will be worked out on a competitive basis with adjoining districts.

Williamson—After working 14 hours continuously, rescuers completed an emergency tunnel into the burning mine of the Sycamore Coal Co. late July 1, and found the bodies of five miners entombed by a mine fire the day before. It is believed this mine fire originated from a faulty electrical connection in the fan house, the draft of the fan carrying it into the mine and cutting off the five men from escape at the mine entrance, also the rescures from penetrating to them.

Eccles—Report has been made to the State Department of Mines that the operations of the New River Collieries Co. which were wrecked by an explosion on Apr. 28, are rapidly being repaired and that it will be possible to resume operations within the next six weeks. When the present repairs are completed, the mines will be in better shape than before the explosion took place.

ALABAMA

Birmingham—Orders aggregating over one million tons of coal have been closed in local circles during the past few days, and another is pending. It was recently announced that the Southern Ry. had confirmed its contract for approximately 700,000 tons, while the Atlantic Coast Line placed its requirements at 235,000 tons. Other roads owned by the Southern are now in the market for 150,000 tons of coal, while the Seaboard Air Line recently placed an order for 400,000 tons.

The Banner Mines of the Pratt Consolidated Coal Co. produced 45,000 tons of washed coal during June, breaking their record. The Flat Top mine of the Sloss-Sheffield Steel & Iron Co. produced 32,000 tons of coal during the same time.

Reports from Chief Mine Inspector Nesbitt's office show that the production of coal in Alabama for the first six months of 1914, is approximately 10,000,000 tons, and the indications are that the tonnage mined during the entire year will break the 1913 record. Mr. Nesbitt states that activity is being shown at all mines, improvements being made, machinery put in repair, and other necessary requirements to run full time and at full capacity.

Brilliant—W. H. Parker of Cullman, Cullman County, Ala., is developing a new mine at Brilliant, in Marion County.

KENTUCKY

Whitesburg—The Perry County Collieries Co. will soon start a coal operation on First Creek, Perry County's new coal field.

Hazard—Operations have been resumed by the Kentucky Jewel Coal Co. after a shutdown for six weeks on account of lack of power. The new generator has been installed and work will be pushed from now on in an effort to make up for time lost in filling orders. The Hazard Dean Coal Co., it is understood, has shut down for a lack of power, though pressed with orders. This firm also will install its power plant at once.

Barbourville—Pittsburgh capitalists are said to have completed a deal for 26,000 acres of coal and timber land in Clay county at the rate of $10 per acre. This constitutes the largest single deal ever made in Clay county and forecasts an early railroad extension into that county from here. The reputed purchasers were in Barbourville early in the season on an inspection tour. A railroad has been projected for some time from here to Manchester to traverse the coal and timber regions, rights of way have been obtained and activity in real estate has increased.

Harlan—Harlan county people, mine operators as well as others, are jubilant over the record of increased output shown by the coal fields of the county. In 1910 (before the railroad entered the county), it produced no coal. In 1911 the tonnage was 15,814, in 1912, it increased to 384,427, while for the calendar year of 1913, according to the figures of the state department, the total output reached 851,412 tons. This year, although the operations in the early part of the season did not immediately show the increase expected, the total output will compare with the gains in previous years and reach somewhere near the 2,000,000 mark.

OHIO

Columbus—Upon the application of Attorney James M. Butler, C. E. Haskins has been named receiver for the Starr-Hocking Coal Co. which has operations in Athens County, he giving bond in the sum of $20,000. He was the superintendent of the company.

Bellaire—The coal mine of the Carnegie Steel Co. on Indian Run was recently inspected by several of the state mine officials and found to be in first-class condition. The inspectors highly complimented mine superintendent R. F. Marling on the manner in which he had obeyed the state mining laws.

INDIANA

Terre Haute—The minority in the U. M. W. members in Indiana has called a special meeting for July 21, to consider charges that state officers have violated the terms of the wage contract in settling grievances in favor of operators. There are specific charges against William Houston president and Thomas Moss, member of the executive board.

ILLINOIS

Maxwell—The mines and mining committee of the County Board of Supervisors have set July 22 as the date for the inspection and survey of the Star mine, which is said to have been driven under county property. On that date the county engineer will go over the operation accompanied by a committee of supervisors to determine whether the mine actually extends beyond the property line of the Clarke Coal Co., which owns the mineral rights to the property.

Duquoin—A snake 5 ft. long and 4 in. in diameter crawled into the feed pipe from the pond at the Paradise mine last week, causing the property to be shut down, and throwing 400 men out of work for a day, until a new pipe was placed.

Hiram Thornsberry, first engineer at the Majestic mine, while oiling the machinery recently leaned too close to a flywheel and was picked up by it and crushed to death.

Belleville—Prospectors are drilling a test hole between here and Marissa to locate the thickness of vein No. 5, which underlies vein No. 6. Owing to the fact that a large portion of vein No. 6 is worked out, the property owners want to ascertain the value of the underlying coal bed in order to dispose of the mining rights.

Carterville—In one of the mines adjacent to this place, a rule has been put into effect that no miner shall load more than 9 tons of coal in 8 hours. The miners' union is in favor

of this, because it gives employment to a larger number of men, and there are thousands of miners idle in southern Illinois at the present time. The operating companies favor it because it gives the men more time to clean their coal and load it properly.

MISSOURI

Kansas City—The meeting of the executive board of the International Mine Workers was held in Kansas City during the week ending July 4. John P. White, president of the U. M. W. A., presided. Thirty delegates attended. The strike at Vancouver, B. C., was the chief topic of consideration.

Cainsville—The coal mine at Cainsville probably will resume operations in the near future. H. R. Waterman, manager, has secured new leases which give the landowners a royalty of 5 cents instead of 10 as in the past.

Warrensburg—George M. Boyd & Sons have purchased a steam shovel and will begin work on the George Burkarth farm near Warrensburg. The mine is the only one in that city.

KANSAS

Osage City—An ordinance fixing the prices to be charged operators for electric current has been passed by the city council. The charge to be made is 3 cents per kilowatt hour for all current supplied to mines outside the corporate limits of the city, provided that the operators will agree to pay a monthly minimum charge not to fall below $83.33 for each mining machine.

MONTANA

Bozeman—The Star Coal Co., of Musselshell, has purchased the steam plant of the Gallatin Valley Mining Co. at Belgrade and the hoisting engine of the Northwest Improvement Co.'s mine at Mountainside, and will shift both to Musselshell where the coal company is opening some valuable property.

PERSONALS

Charles Harvey, one of the best known mine foremen in the Lehigh region, who has been in the employ of the Lehigh Valley Coal Co. for the past five years, tendered his resignation on July 1.

B. P. Friend, a coal operator of Prestonburg, Ky., has been critically ill at the Palace Hotel, at Cincinnati. He was a spectator at a fire when an ammonia tank exploded. It is said that the vapor he inhaled caused his illness.

Cornelius P. Tory has been appointed superintendent of transportation of the Hocking Valley Railway company, succeeding Thomas R. Limer who died recently. Mr. Tory has worked his way up to his present position from the bottom.

John F. Brown, a miner, of Cannel City, Ky., has been appointed to the state board to examine applicants for mine foremanships by Governor McCreary. The law which created the board provided that one of the members must be an employed miner.

A. G. Spillman, General Superintendent of the St. Bernard Mining Company Earlington, Ky., was recently appointed by Governor McCreary as a member of the Board of Examiners, which under the new state mine law grants certificates to mine foremen.

Erskine Ramsey, Jones D. Moore, James E. Strong, W. S. Kahn, and Edward Husband were recently appointed by the governor of Alabama to serve on the State Board of Examiners. Erskine Ramsey was the only former member of the board retained.

OBITUARY

Richard White, aged 64 years, a retired coal operator of Pottsville, Penn., was found dead in his bed on the morning of June 30. He had been engaged in coal operations for the past 25 years and was well and favorably known throughout the entire anthracite region. Mr. White is survived by 8 children.

James McCormick foreman of the Jamison Coal Co. formerly of Latrobe, Penn., but who has resided at Barrackville, W. V., for some time past died recently after a brief attack of heart trouble. Mr. McCormick was 64 years of age, had been in the service of the Jamison company for some time and was a valued and trusted employee. He is survived by his wife and four children.

CONSTRUCTION NEWS

Windber, Penn.—John and Thomas Locthrie, who recently acquired the Manges coal tract, have started work on an opening on the Manges farm.

Nanticoke, Penn.—The Jenkins Contracting Co., of Mt. Carmal has been awarded the contract by the Susquehanna Coal Co., to sink a shaft at Nanticoke 540 ft. deep and 15x25 ft. in cross-section.

Whitesburg, Ky.—A new industrial city is being laid out below here in Perry County, one mile from Hazard, and equidistant from the four operations of the Ashless Coal Co., the Kentucky Jewel Co., the East Tennessee Coal Co. and the Virginia Coal & Coke Co. Already numbers of lots have been sold and several stores are in course of construction.

Bower, W. Va.—The Davis Colliery Co. is building one of the best store buildings to be found anywhere in this section of the state, to replace the one burned down some time ago. This structure will be of brick and cement and made as near fireproof as possible. The approximate dimensions are 35 ft. wide, 82 ft. long and three stories high with a basement the full size of the building.

Imperial, Penn.—Plans are being made by the Montour & Lake Erie Coal Co. for the opening of a new mine in Imperial. The full supply of machinery has been purchased and construction work will begin in a short time. The output of the mine will eventually be about 150 tons daily, and 350 men will be given employment. The work will be under the direction of Andrew Wilson.

Leavenworth, Kan.—W. J. Squire, president of the Squire Electric Co., of Kansas City, has taken over the old Brighton mine near Leavenworth and proposes to spend about $500,000 in its rehabilitation. The mine will be electrified and a power house will be built at its mouth. Other capitalists also are interested with Mr. Squire and the group has asked the city of Leavenworth for a franchise to sell light and power in that city.

Buffalo, N. Y.—Work has begun on the by-product plant of the Niagara Coke Corporation, which sometime ago bought 40 acres of land adjoining the works of the Lackawanna Steel Co. It is stated that $2,000,000 will be spent in setting up the plant and that it will be in operation with 100 ovens early next summer. The capacity will be doubled if necessary. The coke will be sold in the open market and the gas to the steel company.

Highland, Penn.—The G. B. Markle Co. houses at this place are at present in the hands of a force of carpenters, who will greatly improve the buildings and enhance their appearance. Front porches will be erected on every house, new fences constructed and additional improvements made to the interior. The roadway will be repaired and side walks laid. The company is to be commended upon the improvements being made to its mining towns in general.

Columbus, Ohio—The route of the proposed freight line of the Chesapeake and Ohio from Portsmouth to Columbus, Ohio has been finally determined upon. This action was taken by the board of directors at a recent meeting held at Maysville, Ky. According to the plans approved, the Ohio river bridge will be built at Sciotoville, seven miles east of Portsmouth. From that point the line will follow the Little Scioto River to a point east of Stockdale in Pike County where it will turn westward and meet the Scioto River. Neither Circleville nor Chillicothe will be touched. It is expected that the construction of the line will be completed in two years. Application to the U. S. War Department for permission to build the bridge will be made at once.

Whitesburg, Ky.—At least five branches are to be built by the Louisville & Nashville R.R. Co. this year into the Letcher-Perry coal field. One already started, will extend 5 miles up First Creek from Typo station to the development work of the Perry County Colleries Co. Another, of three miles, is to parallel Carr's Fork to the Knott county border, where an Eastern syndicate will start a coal and timber development. Davidson Creek will get a three mile branch just above Hazard, where the East Tennessee Coal Co. and the Ashless Coal Co. are starting big developments and from which they expect to be shipping coal within two months. A fourth line is being pushed up Big Leatherwood Creek as far as Daisy where developments are underway. Of the fifth and sixth extensions, one is to run from 12 to 16 miles to Line Fork, while Rockhouse Creek may be the terminus of the other. The Potters Fork, Yount's Fork and Bottom Branch lines of the L. & N., have been completed and the three branches are carrying coal and lumber.

NEW INCORPORATIONS

Linton, Ind.—The Twin Oak Coal Co. has dissolved.

Fargo, N. D.—The Dunn Coal Mine Co. at Leigh has been reorganized into a new firm to be known as the Black Diamond Coal Mine.

Charleston, S. C.—The Dry Fork Coal & Timber Corporation has been given the right to increase its capital stock from $45,000 to $300,000.

Wilmington, Del.—The Banner Coal Mining Co., has been organized with a capital stock of $50,000. Charles Francis Brown is at the head of the new concern.

Williamsburg, Ky.—The Letz Jellico Coal Co. has been incorporated with a capital stock of $100,000; the incorporators are J. W. Latham, J. R. Zimmerman and C. M. Smith.

Kansas City, Mo.—The Chilhowee Coal & Coke Co. has been organized with a capital stock of $200,000. The incorporators are Milton Walsh, H. B. Henry, and Arthur Nelson.

Pittsburgh, Penn.—The Peters Creek Gas Coal Co. has been chartered with a capital stock of $30,000. The chief incorporators are Charles W. Braznell, of Pittsburgh, and R. A. Braznell, of Edgewood.

Clothier, W. Va.—The Spruce Fork Coal Co., has been organized with a capital of $50,000, the incorporators are William B. Watkins, J. A. Wilcox, John L. Montgomery, H. E. Marlor and Andrew W. Border.

Scranton, Penn.—The Temple Iron Co. has been reorganized with a capital of $4,000,000 divided into $2,000,000 of 8% preferred stock and $2,000,000 of common stock. There will also be $2,500,000 in 5% bonds.

Nelsonville, Ohio—The Carter-Spencer Coal Co. has been organized with a capital stock of $50,000 for the purpose of mining coal. The incorporators are John Carter, Harry Ball, George S. Evans, J. T. Thompson, and J. N. Smith.

Tams, W. Va.—A charter has been issued to the Wyoming Fuel Co., which will have its chief works at Slab Fort in Wyoming County. The capital stock is $100,000 and the incorporators are W. P. Tams, Jr., John W. Wilson, James O. Watts, G. M. Vaughn and P. T. Watts, Jr.

Uniontown, Penn.—The W. A. Stone Coal & Coke Co., has surrendered its charter in West Virginia and has discontinued business as a corporation in that state. Albert Gaddis, of Uniontown was president of the company, the property of which has been purchased by the W. A. Stone Fuel Co.

Lexington, Ky.—The Commonwealth Coal & Timber Co. has been incorporated with a capital stock of $10,000 to develop coal and timber lands in Perry, Knox, Leslie and Letcher Counties. The incorporators are Samuel W. Wilson, president, Clinton M. Harbison, vice-president and treasurer, Samuel H. Halley and T. M. Smith, of Lexington, George S. Shanklin, Jr., of Whitesburg, secretary, L. W. Fields, of Whitesburg, manager, and Jesse Morgan, of Hazard.

Bristol, Tenn.—The Empire Coal & Land Corporation which failed two years ago as a result of a temporary financial stringency is to be reorganized and rehabilitated. A meeting of the holders of the $750,000 of the company's bonds was recently held at which a committee composed of H. G. Morrison, of Johnson City, T. F. Hogan and H. E. Jones, of Bristol and A. K. Morrison, of Big Stone Gap was appointed to draft a plan for reorganization.

INDUSTRIAL NEWS

Birmingham, Ala.—The Gulf States Steel Co. has recently put 300 coke ovens in operation at its Virginia mine after a short shut-down.

Drifton, Ala.—C. C. Gravelee has taken over the Borden Mines at Drifton, Walker County, Alabama, and will take steps to immediately increase the output.

Taits Gap, Ala.—The Taits Gap Coal Co., with mines at Taits Gap, Ala., is making improvements that will double its output. Watt Brown of Ragland, Ala., is president.

Scranton, Penn.—C. D. Simpson recently purchased the interest of the Yost estate in a tract of coal land comprising about 820 acres near Shenandoah for a sum said to be in the vicinity of $2,000,000.

Hamilton, Ontario—A large by-product coke plant is projected for supplying gas to the iron furnaces at Hamilton, Ont., in which the owners of the furnaces are said to be interested. The amount of natural gas developed in that vicinity in the near future will have a bearing on the new undertaking.

Columbus, Ohio—Owing to the prolonged coal strike, a big decrease is shown in the net and gross earnings of the Hocking Valley Railway company for the month of May, the report for which has just been made public. The operating revenue for the month was $442,016 as compared with $755,450 for May of 1913.

Hurricane, Va.—C. E. Bockus, vice-president of the Clinchfield Coal Corporation, Dante, Va., has just placed a contract with the Roberts and Schaefer Co. for approximately $50,000 for the design and installation of a Marcus patent, five-track steel coal tipple with a 600-ft. inclined car haul, all to be electrically operated, at the mine at Hurricane, Virginia.

Chicago, Ill.—The Chicago branch of Keuffel & Esser Co., of N. Y., has completed its removal to its new quarters, 516-518-520 South Dearborn St., Chicago. The company recently purchased this building and occupies the greater part of it. It is situated near the "loop" and half a block from an "L" station, being midway between Van Buren and Harrison Streets, on the west side of South Dearborn Street.

London, England—A new idea was presented at a recent meeting of the Iron & Steel Institute in London, concerning the by-products from coke making and the utilization of blast furnace gases. It is believed that synthetic rubber may be produced from coke oven gases, the President saying that "the experiments which have been made permit the foreshadowing of the manufacture of artificial rubber."

Fleming, Ky.—Beginning July 15 the Elkhorn Mining Corporation will make some large increases in its plants in Fleming, Haymond and Hemphill. The Lexington & Eastern R.R. has recently completed branch lines into Haymond and Hemphill and the shipment of coal has started on a large scale. Several hundred additional hands will be put to work on the 15th. The company contemplates opening some new mines.

Knoxville, Tenn.—A meeting of the creditors of the bankrupt Ideal Block Coal Co. was recently held in the Federal Court at Knoxville. The receiver, E. G. Stooksbury, of Knoxville, was unanimously elected Trustee and at the request of the creditors, was instructed by the Court to close out the affairs of the company and sell all tangible assets as soon as possible; pay off the preferred creditors, and report to the Court again on July 16.

Kansas City—The ouster order registered by the Missouri supreme court against the Central Coal & Coke Co. last fall has been withdrawn so long as that company, and others involved in the same case, show a disposition to obey the state laws. The fine of the company was reduced from $50,000 to $30,000. Though lumber companies were principally interested several coal and mining concerns were included in the list.

Cincinnati, Ohio—Judson Harmon, former governor of Ohio and Rufus B. Smith, both of Cincinnati have been appointed receivers of the C. H. & D. R.R. Co. The suit for receivership was filed by the Bankers' Trust Co., of New York. At the same time a mortgage for $36,000,000 held by the trust company is asked to be foreclosed. The petition declares the total bonded indebtedness of the road is $75,000,000. The cause for the receivership is given as the devastation of the flood of 1913 together with the business depression which has followed.

Columbus, Ohio—For the third time since a workmen's compensation act has been in force in Ohio, the commission having charge of the administration of the law has announced a radical reduction in the rates of insurance charged employers, the cut this time averaging about 6 per cent., as against a reduction of 10 per cent. in July, 1913, and of 22 per cent. in November, 1912. That of last year was made retroactive, and involved the return to employers of over $70,000. It is estimated that the latest cut, which is also retroactive, will involve the refund of $100,000 to employers, out of the surplus of nearly $2,000,000 in the hands of the commission. Over 1400 industries receive the benefit of the reduction, while two, stevedoring and freight car manufacturing, have had their rates increased, as a result of the experience of the commission showing the high cost of the insurance. Coal mining, among about a dozen industries, is left uncharged as to the rate charged, which is entirely satisfactory to operators, as they had anticipated an increase at the time of this readjustment of the rates.

Coal Trade Reviews

General Review

Curtailed mining in the anthracite regions and the market continues under heavy pressure. Eastern bituminous situation dull and weak, but gradually improving to the westward. Lake movement unsatisfactory. Agreement reached on the Ohio wage scale.

The heavy curtailment throughout the hard-coal regions last week had little effect upon the anthracite market, and further restrictions were necessary during the current week, with every indication that this will continue until the fall demand opens up. Under existing conditions, it is useless to urge sales. A large increase in the Lake movement is noted for last month, but the tonnage for the season is substantially less than last year.

The bituminous market continues generally heavy in all parts of the country, with down east New England points leading the slump. Large tonnages of consignment coal are coming in, while demurrage bills are accumulating, and there has seldom been such a wide margin between prompt and contract prices as now rules. Competition on new contracts is unusually aggressive. Shipments are confined more closely to requisitions on contracts, which have increased somewhat; but, on the other hand, the heavy export business of the past few weeks has slowed down materially. Operations in the mining districts tributary to the Eastern markets were somewhat stronger during the current week, although this was probably the result of the shutdown over the Fourth of July.

Reports of a car shortage at the head of the Lakes, with a consequent congestion on the docks, probably accounts for the slowing up in Lake shipments out of the Pittsburgh district. Some indications of an improvement are noted, and many of the agencies are optimistic over the outlook, though without tangible evidence of their reasons. Prompt business is invariably subject to substantial cuts, and even moderate concessions are heard on new contracts. The final agreement on the wage scale in most of the Ohio districts, subject only to the referendum vote of the miners, now places the operating companies there in a position to negotiate new contracts. As a result, there is considerable activity in trade circles, but the agencies are compelled to work hard for orders. Lake shipping continues slow, though with prices holding relatively firm, and some indications of an improvement.

The demand is somewhat brisker to the South, where the surplus tonnages are being used up, and there is less coal on demurrage than for a number of months; buyers are also showing less hesitancy about contracting, and negotiations are usually for longer periods. The Middle Western market is steady, with a strong rising tendency. The abnormally large crops and the uncertainty as to the possibility of a severe car shortage have created a moderate anxiety among consumers, who are now seeking to accumulate some surplus coal. Half-time operations are the rule at the moment, but this will be gradually increased as the crop movement gets under way.

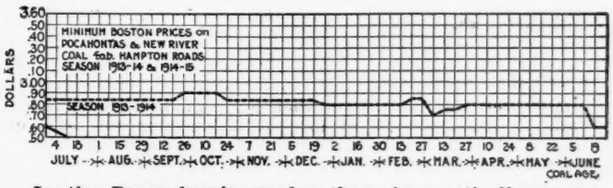
ATLANTIC SEABOARD

BOSTON

Market coal still an affliction in this territory. Prolonged delay in disposing of cargoes. Hampton Roads grades still continue accumulating and no improvement in sight. Only a small movement of the Pennsylvanias. Dock screenings in short supply at the anthracite piers.

Bituminous—There is apparently no let-up to the volume of market coal being sent to the New England ports. Prices on Pocohontas and New River are therefore as weak as ever and perhaps the only change in the situation is in the longer time it takes to dispose of the coal. The demurrage bills must be heavy and the query is how long will West Virginia operators be willing to sand both the low level of prices and the expensive charges for vessel destination.

The few contracts still unplaced are soon coming into the market and all the agencies are interested to see what prices are developed. There has seldom been a season, however, when the discrepancy was so great between spot and contract coal for delivery over several months or a year. Some large buyers who usually make contracts are still buying from hand to mouth as bargains offer, and no doubt they have made a very large saving in doing so. The accumulation at Hampton Roads is still heavy, and once a loading order is issued it is only a matter of hours and minutes before the cargo is on the way. In all the ports there are steamers, barges, and sailing vessels awaiting charters and few in the trade can recall a time so absolutely dull in steam coals as the present.



In the Pennsylvania grades there is practically no improvement. Shippers of the preferred coals are able to keep mines running, although on short time, by selling at 10@15c. less than the season contract basis, but the less favored grades are having great difficulty in moving any tonnage whatever. Space in anthracite barges from Philadelphia is now available to most of the Pennsylvania coals and a somewhat better movement is expected in the course of the next few weeks.

Georges Creek is put on wheels only on firm orders and for application to contract. For spot sale there is almost nothing doing. Prices are nominal on the same figures.

Anthracite—So small an amount of domestic sizes has been dumped over the piers the last week or so that the supply of dock screenings is short. The large city dealers rely on a fairly regular supply and are scurrying around to procure shipments of rice and barley as a temporary expedient. July promises to be dull in anthracite also and no demand is looked for until stocks begin to move to the consumer in September.

Current prices on bituminous at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*.....	$0.85@1.45	$1.20@1.60	$1.67@1.77	
Philadelphia*.....	2.10@2.70	2.45@2.85	2.92@3.02	
New York*.....	2.40@3.00	2.75@3.15	3.22@3.32	
Baltimore*.....	.....	.....	2.85@2.95	
Hampton Roads*.	.....	.....	.....	$2.50@2.80
Boston†.....	.....	.....	.....	3.15@3.63
Providence†.....	.....	.....	.....	3.20@3.68

* F.o.b. †On cars.

NEW YORK

Temporary improvement in bituminous but aggressive competition for business prevails. Anthracite trade soft with all grades in easy supply.

Bituminous—Some slight increase in orders has developed during the week. Requisitions on contracts are a trifle heavier and mining operations have been increased at some points. Although this has created a somewhat better feeling among the trade, the improvement is due, in most part, to the curtailed operations over the holiday of last week, and, in any event, it is not of sufficient proportion to create any general optimism.

What few contracts remain to be closed are subject to aggressive competition among the selling agencies. Of these, the most important yet to be signed is the contract for the New Haven subsidiary companies involving about 120,000 tons of coal, and this is usually low priced business. Some minor contracts are being signed up, from time to time, as they expire. Consumers who have held off contracting this year have done much better than those closing early in the season, which is in direct contradistinction to conditions prevailing last season.

A little western Maryland coal is still occasionally reported on demurrage, but the volume is insignificant and the market is in unusually good shape in this respect. Bunker-

ing trade continues light. Prices are not quotably changed from last week, which we continue as follows: West Virginia steam, $2.50@2.60; fair grades Pennsylvania, $2.55@2.65; good grades of Pennsylvania, $2.70@2.80; best Miller Pennsylvania, $3.10@3.15; Georges Creek, $3.15@3.25.

Anthracite—The market is generally soft on all sizes. Stove coal is now the only grade selling at the full circular, and some additional tonnages of this might be used in some instances, but, as a rule, orders can be promptly filled. There is an unconfirmed rumor to the effect that the Reading Company has 400,000 tons of chestnut coal in storage. Pea and buckwheat grades are, of course, going into storage but not in such large volume now that mining operations have been restricted.

Egg and nut coal can only be moved by giving the buyer a certain proportion of stove; even under these conditions, concessions of 10 to 25c. are made on egg coal and 15 to 40c. on the regular circular can be done on nut. Straight nut has been offered at $4.75 at the lower ports. Pea is in about the same condition, selling at 30 to 40c. off the circular. The low-grade buckwheats are quoted at from $2 up, with the high grades at $2.55; the low grades of No. 2 are at a minimum of $1.50, with the high grades at $2.15, while the high and low grades of No. 3 can be obtained at $1.60 and $1.25 respectively.

The New York hard-coal market is now quotable on about the following basis:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$4.90	$4.60@4.90	$4.85	$4.55@4.85
Egg	5.15	5.00@5.15	5.10	4.90@5.10
Stove	5.15	5.15	5.10	5.10
Chestnut	5.40	4.95@5.40	5.35	4.75@5.35
Pea	3.55	3.40@3.55	3.50	3.10@3.50
Buckwheat	2.80	2.60@2.80	2.50@2.75	2.00@2.75
Rice	2.30	2.15@2.30	2.00@2.25	1.50@2.25
Barley	1.80	1.60@1.80	1.75	1.25@1.75

PHILADELPHIA.

Little change noted in anthracite market. Curtailed operations generally in effect. No immediate improvement looked for. Bituminous maintains its listless attitude, with demand weak.

Anthracite—Judging from reports emanating from all sections of the country, the anthracite situation is not likely to show much improvement during the coming two months. Retailers generally claim that the industrial depression has made funds so low, that they hesitate to put coal out on orders, where the customer states that it is likely to be well into the fall before he will be in a position to settle the bill.

Curtailed operations at the mines has improved the situation to a certain extent, but the market still fails to absorb certain sizes. Broken egg and stove seem to be moving fairly well, but the balance of the sizes are in excess of the requirements, and as a result, there are reports that considerable coal is still going into stock. It is nevertheless a fact that the large operators are handicapped in placing their output because of the heavy concessions offered by the individuals. April and May prices for egg and chestnut are plentiful; pea is selling at even less than contract price, and where this fails to bring results the added attraction of the absorption of the state tax, is made.

The demand still centers on stove size, which is moving freely. In fact, it is understood that none of the companies have been able as yet to accumulate any of this grade, which is in marked contrast with two years ago, when stove was practically in the same position as now exists with chestnut. What remedy will be applied is problematical, but the continued falling off in demand for chestnut, is likely to force the issue.

Bituminous—Purchasing agents are shopping around the market at the present time, and solicitations that they contract, meet with slight success. The future holds out little hope for improvement either in demand or prices. Fair Pennsylvania coals are quoted at 90c. to $1 and the better grades $1.25 to $1.35, at the mines.

BALTIMORE

Market continues dull and flat. Severe car shortage anticipated this fall. Exports for June break all previous high records.

Except for the contract business the coal trade East remains remarkably dull. Efforts to force the market has resulted in some sacrifice sales, and the move is not being pushed. The West Virginia gas-coal situation is still being aided by call from the Middle West, and three-quarter that is selling East around 85c. is good for 10c. higher to Western customers in many cases. Pennsylvania fuels remain steady in the face of a listless call.

Car movement continues poor. This condition has been a figure now for several weeks and there seems little prospect of a change. Coal men fear that when the rush of business comes in the late summer and fall that the railroads will be in worse shape for prompt movement than has been the case for a number of years past. Less has been expended for equipment and upkeep recently than has been the case for a considerable period.

In anthracite the usual summer deliveries are now being made. Most dealers report things flat, but believe that the trade will have a busy and profitable late summer and fall season.

With a splendid total of 116,313 tons of bituminous exported for the month of June, the records of the port of Baltimore on this class of business were shattered. The highest previous record was made in June, 1913, when a total of 110,091 tons was exported. The shipments last month have a total value of $323,125. About one-quarter of the coal went to France, a comparatively new purchaser in this field, and the balance was widely distributed, being taken by the Philippines, Cuba, Italy, Egypt, Costa Rica, Porto Rico, Panama and Spain.

HAMPTON ROADS

Shipments for week somewhat light. Few inquiries for spot coal. Dumpings for month of June totaled 965,991 tons.

While coastwise shipments for the week have been about fair, the foreign movement was light, few cargoes moving. The largest shipments have been to Genoa and Venice, with some coal moving to Canal Zone, La Plata, Montevideo and Cuba. In addition to this the government has loaded one steamer with a cargo for the naval station at Cavite and Olongapoo, P. I.

Little if any high-volatile coal is being moved and there is no demand for this or prepared coal. There are few inquiries even for New River or Pocahontas run-of-mine, and such shipments as have been made so far as can be ascertained have been mostly on contract.

The total dumpings at the piers for the month of June amounted to 965,991 tons. Of this the Norfolk & Western dumped 500,444 tons, or more than the combined tonnage of the Chesapeake & Ohio and Virginian Rys., the Virginian dumping only 222,837 and the Chesapeake & Ohio 242,710 tons. While the tonnage for the month has not been as heavy as for the same period in 1913, conditions have also been somewhat different, and the total was more than was expected generally.

LAKE MARKETS

PITTSBURGH

Demand slack and mining operations slightly reduced. Lake movement decreased rather than increased Prices still irregular.

Mining operations in the Pittsburgh district have undergone a slight decrease, apart even from the decrease which naturally comes from the celebration of the national holiday. The line demand has fallen off a trifle and there has been a little decrease in Lake shipments. The ore movement continues relatively light so that vessel tonnage is not very plentiful and from the Northwest come reports of car shortage and consequent congestion of docks.

The market continues ragged as to prices, large contracts when negotiated, frequently going at concessions from the regular list, while free coal almost invariably is subject to cutting. Slack is selling at 50@60c. for prompt lots. Circular prices remain: Slack, 80@90c.; nut and slack, $1.05; nut, $1.25; mine-run, $1.30; ¾-in., $1.40; 1¼-in., $1.50, per ton at mine, Pittsburgh district.

BUFFALO

Indications of an improvement in bituminous. The fall car shortage will create a shortage. Small consumers coming into the market. Anthracite will not move till fall, but will be brisk then.

Bituminous—There are a few jobbers who claim to see an improvement. They say that the wave of returning business is starting and that it will be here with the movement of the fall crops. There is better buying on the part of most of the small consumers, but the railroads and other large concerns are still holding off. There is a good reason for the demand being light. With the salesmen it has been a matter of how much they could urge upon the consumer, ever since the car supply became plenty last fall. In fact it was the car shortage alone that produced the brisk trade last summer.

Meanwhile the bituminous trade will hold a firm hand and see that there is very little coal on track unsold and where it has to be turned over unexpectedly there will be

great care and dispatch in doing it. The margin on any sale is too small to admit of any loose practices. In fact some mine owners are confessing that they cannot operate at a profit.

There are plenty of jobbers who refuse to sell coal at reduced prices, although others having off grades are accepting reductions. The circular remains at $2.80 for Pittsburgh lump, $2.70 for three-quarter, $2.55 for mine-run and $2.15 for slack. The market for slack is especially dull. Allegheny Valley prices are 15 to 25c. below Pittsburgh for sizes. The mines are not running much above half-time.

Anthracite—It is useless to urge sales, as the consumer seldom purchases in midsummer and is, if anything, buying less now than usual at this time of the year. When the cool weather sets in, there will be the usual rush. The mines are not running strong, as there is a prospect of a filling up of all storage space before the movement begins. As a rule the small dealers are not trying to help out. They cannot be made to see that there is profit in carrying a stock of coal through the summer.

Shipments of anthracite from this port for the week were 173,000 tons and for June, 805,879 tons, as against 642,110 tons for June last season. For the entire season the amount was 1,409,325 tons and for last season to July, 1,785,974 tons. The gain of more than 150,000 tons last month after a slow start shows the eagerness to make the most of this movement during the slack season.

COLUMBUS

Agreement on the wage scale in most of the Ohio fields stimulates some activity. Considerable contracting. Domestic business increasing and prices stronger.

With the settlement of the strike, more activity is shown in Ohio markets. Steam users who have been getting their supply from West Virginia and Kentucky are looking to make contracts for Ohio coal. Due to the suspension, very few steam contracts had been made recently. Manufacturing is still slow as a result of business depression and requirements are at a low ebb. Railroads are making steam contracts at a lower figure than prevailed last year.

In the domestic trade more activity has also developed. Dealers' stocks are generally small and they have been loath to push trade under those conditions. With better supplies they will soon be in a position to furnish coal for stocking purposes. There is a marked preference shown in this market for Pocohontas and re-screened varieties. Domestic prices show a slight strengthening. Lake trade is also expected to be more active in the near future and preparations are being made to ship a large amount of coal to the Northwest via the lakes.

What quotations are being made in the Ohio fields are as follows:

	Hocking	Pittsburgh	Pomeroy	Kanawha
Domestic lump	$1.50@$1.40		$1.50@$1.40	$1.50@$1.40
¾-inch	1.35@ 1.30	$1.20@$1.15	1.35@ 1.30	1.30@ 1.25
Nut	1.30@ 1.25		1.25@ 1.20	1.25@ 1.20
Mine-run	1.15@ 1.10	1.10@ 1.05	1.15@ 1.10	1.10@ 1.05
Nut, pea and slack	0.85@ 0.80		0.85@ 0.80	0.80@ 0.75
Coarse slack	0.75@ 0.70	0.85@ 0.80	0.75@ 0.70	0.70@ 0.65

CLEVELAND

Midsummer inventories and holiday shut-downs have reduced the coal requirements for the time being. Settlement of Ohio wage-scale. Fourth of July holiday causes a congestion at Lake ports.

Following the shut-down for the Fourth of July several large industries in Cleveland and surrounding cities have closed for repairs and inventory, thereby curtailing the demand, but without bringing a material reduction in prices. The trade continues to hold to orders and very little free or consignment coal is on track. The demand is for current use and prices vary not more than 5c. from quotations. Unless coal is sent on consignment or was purchased when the market was lower, no important concessions are being made.

Fairmount coal is coming in in small quantities as the gas-coal operators there are holding to higher prices. Youghiogheny, Pittsburgh and Richland, West Va., No. 8 are the only coals being offered on the market. Fine coal, which is about the only size in any demand, is being sold at $1.60 to $1.65.

With the adjustment of differences with the miners in the Hocking, Jackson, Pomeroy, and part of Crooksville districts, some Ohio coal will be offered here within a few weeks. These fuels do not come into this market as a rule unless prices are high, and there is little reason to expect much Ohio coal as the Lake trade will take all the Hocking produced before Oct. 1. It is a general practice to ship the Lake trade all the Hocking up to Sept. 15 or Oct. 1, after which the all-rail business is taken care of.

The Lake trade is not improved from what it was a week ago. Youghiogheny, Fairmount Gas, splints and Pocohontas have been going forward, but not in as large quantities as they should. The Pocahontas operators have not been able to dispose of the slack produced in making the prepared sizes and therefore have curtailed shipments of these grades as much as possible. This has resulted in the Lake contracts getting the benefit, though a broader market for slack would increase Lake shipments.

Hocking shipments will increase the Lake trade somewhat and will probably also increase the congestion at the docks in Toledo. With the exception of the C. H. & D. dock at Toledo every coal loading dock on Lake Erie was shut down on both July 4 and 5. The C. H. & D. had thirteen vessels waiting July 2 and several boats were due July 3. Boats arriving at Sandusky, Lorain and Toledo July 3 were mostly too late to go out before the docks shut down for the holiday.

There were so many boats waiting to unload at Lake Erie ports Monday morning that congestion was the rule. This resulted in a large number of vessels being sent to the coal docks to wait for coal to come in, and it will be a week or ten days before the docks are able to load ships as promptly as they have the last two weeks. Vessels have been held two to three days up to this time.

Quotations, Cleveland prices, for shipment are as follows:

	Pocahontas	Youghiogheny	Fairmount
Lump	$3.60		
Lump, 1¼-in.		$2.35	
Lump, ¾-in.		2.25	$2.05
Mine run	2.60	2.10@2.15	1.95
Egg	3.60		
Nut		2.20	
Slack	2.20@2.35	1.55@1.60	1.65

CINCINNATI

Dullness continues in all departments. Demand so poor that operators have difficulty in disposing of even a limited production.

With July well started, the coal trade has been expecting almost daily indications of an improvement in the market, but so far it has failed to materialize. Failure of the steam market to pick up is not difficult to understand, in view of the fact that most of the manufacturing industries are operating on slow time; but it is not easy to see why the domestic market remains dull. Operators are of the opinion that substantial stocks have been carried over from last season, both by dealers and domestic consumers. But on the other hand the demand during the latter part of the winter was very dull, the consumers apparently relying upon their diminishing stocks to carry them through. Even with fairly liberal transportation facilities available on the Lakes, the movement there continues slow, indicating that the market is fairly well supplied.

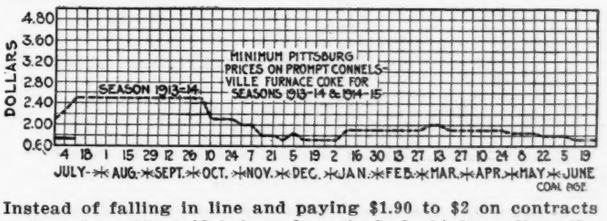
Locally the demand continues slow for domestic grades, smokeless being the sole exception, as usual. Dealers are apparently not at all anxious as to supplies later on, despite the shortage which must inevitably result from the situation in the Ohio and West Virginia fields. A better tone is anticipated, although there seems to be little tangible reason for this.

COKE

CONNELLSVILLE

Market receives setback. Consumers buy July coke at much less than demanded on second-half contracts.

The coke market has received a decided setback. Sellers were greatly encouraged by contracts placed some ten days ago, three lots aggregating 27,000 tons a month over second-half going at $2, the top price asked for some time.


DOLLARS
4.80
3.60
3.20
2.80
2.40
2.00
0.60
MINIMUM PITTSBURG PRICES ON PROMPT CONNELLSVILLE FURNACE COKE FOR SEASONS 1913-14 & 1914-15
SEASON 1913-14
4 18 1 15 29 12 26 10 24 7 21 5 19 2 16 30 13 27 13 27 10 24 8 22 5 19
JULY- AUG. SEPT. OCT. NOV. DEC. JAN. FEB. MAR. APR. MAY JUNE
COAL AGE

Instead of falling in line and paying $1.90 to $2 on contracts—the coke sold at $2 being of particularly high quality—the other consumers who were uncovered have proved that they could buy prompt and July coke of fair grade at about $1.75, and have covered for short periods at this price, so as to put off the necessity of making contracts. The operators who were holding out for $2 maintain the position but recognize that they can hardly obtain the figure until iron and steel conditions improve considerably. Such an improvement is now fully expected. The market is quotable as follows:

Prompt furnace (including July) $1.75@1.80; contract furnace, $1.90@2; prompt foundry, $2.30@2.50; contract furnace, $2.35@2.50, per ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ending June 20 at 2"1,553 tons, a decrease of 1022 tons, and shipments at 270,397 tons, an increase of 10,132 tons.

BUFFALO

There is said to be a special reason for the general dullness in coke. The byproduct coke manufacturers are active and increasing, so that it is not believed that the Connellsville district will ever fully recover its lost ground. The economy of the byproduct oven is hard to compete with. Prices are as dull as ever, being on the basis of $4.25 for best 72-hr. Connellsville foundry and $3.25 for stock coke.

BIRMINGHAM

Coke market exceedingly quiet, both on foundry and furnace grades.

There is really nothing much to say regarding the Birmingham coke market. With the exception of a little spurt about last December, the market in this district has been very weak. Some of the manufacturers of high grade 72-hr. foundry coke state that their business has been fairly satisfactory, while the manufacturers of 48-hr. furnace coke complain that there is nothing doing. No immediate improvement is looked for, at least until the iron market picks up.

CHICAGO

The coke market is slack. There is sharp rivalry for what business develops in foundry coke with a tendency to cut prices. The circular price for byproduct advanced July 1 to $4.75 Chicago, and gas-house coke has been reduced from $4.25 to $4.15. Connellsville and Wise County are quoted at $5@5.25.

SOUTHERN

BIRMINGHAM

Lump coal market weak and steam grades only fair. Blacksmith coal about the same. Fairly good tonnage of pig iron sold, though prices are low.

The lump coal market is very weak, few sales of any importance being made, and the indications are for a rather hard summer. Steam coal is little better than lump. Although some contracts are being made, these were more in the nature of renewals, and had already been discounted. Blacksmith coal seems to be holding its own both as to tonnage and prices. The producers of this grade state that business is fairly good. A good tonnage of pig iron was sold on the approximate basis of $10.50 f.o.b. Birmingham.

LOUISVILLE

Eastern Kentucky market active. Buyers inclined to cover their requirements and drop out of the prompt market.

Though conditions in the western Kentucky field continue backward, the situation in the eastern Kentucky field has shown greatly increased activity. Domestic coals are in more than brisk demand at a ten- to fifteen-cent advance, while stocks of steam sizes are being rapidly cut down and there is much less on demurrage than for the past three or four months.

In western Kentucky, sales are being made at what the market will bring, no stable basis having been established; the mines are working from one-third to two-thirds full time. The quotations for eastern Kentucky coals vary from 40 to 75c. for nut and slack; 90c. to $1 for six-inch run-of-mine; $1 to $1.05 for steam run-of-mine and from $1.60 to $2 for block coals, all prices f.o.b. mines.

MIDDLE WESTERN

INDIANAPOLIS

Mines on half-time, with a few doing slightly better. Crop movement near and railroads will be larger buyers then. Prices at lowest summer level, with exception of slack.

The mines, as a whole, are on half-time or possibly a shade better, with some companies doing much better, and a very few on practically full time. The industry is waiting for the improvement expected with the beginning of the crop movement. The railroads have been putting thousands of cars in readiness for this, and they will be larger consumers, while it is expected related industries will also show more activity. The money put in circulation by the crop movement should create a demand in many lines that will improve general industrial conditions.

Slack is the only grade for which the demand seems to tax the supply. It is selling at 80c. to 90c., as against not much more than one-half of that at this time last year. This may be due to the Keokuk dam across the Mississippi, which has cut down the demand for slack about 50,000 tons a day. Retailers report a good summer movement of domestic grades to consumers' storage bins.

CHICAGO

Chicago dealers expect to handle an unusually large tonnage next fall. The market is already moving toward a better position. Production being restricted.

It is estimated that the amount of coal moving into Chicago at present is about 30% normal and when the fall rush begins it is expected that operators will be confronted with inadequate transportation facilities. The railroads have purchased only a small number of new cars and engines and in many instances have permitted their rolling stock to deteriorate. This means that a record coal tonnage must be moved during both a low railway efficiency and a small car supply.

There is a stronger tone to the smokeless market. A large amount of this fuel on track has been disposed of and comparatively little is being forwarded. On this account dealers are able to adhere to the circular price which advanced to $2 a ton July 1, on smokeless lump and egg. The demand has been good. Orders from the country for splint coal are arriving in considerable volume. As a number of the mines are still closed down by a strike, the amount of this fuel received in Chicago has been reduced.

Prevailing prices are:

	Springfield	Franklin Co.	Clinton	W.Va.
Domestic lump	$2.07	$2.40@2.55	$2.12	
Steam lump	1.97		1.97	
Egg		2.40@2.55		$4.05
Mine-run	1.87	2.15@2.25	1.87	3.30
Screenings	1.67	1.95	1.67	

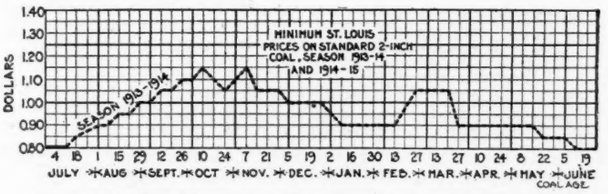
Quotations on Harrisburg coal are: Domestic lump and egg, $2.40; steam lump, $2.25; mine run, $2.15@2.25; screenings, $1.95; No. 1 nut, $2.55; No. 2 nut, $2.40.

Carterville prices are: Lump, $2.40; egg, $2.40; No. 1 washed, $2.55; No. 2 washed, $2.45.

ST. LOUIS

Slightly better movement, particularly on the higher grades. Steam trade stationary and anthracite dull.

A slight picking up in the way of tonnage for the first few days in the month indicates that business will be fairly good for the next week or ten days. The market did not advance on screenings, as it was expected to; as a matter of fact, all steam coals remained stationary, with a tendency to weaken if anything. The higher grade coals show a better movement, with a tendency towards a higher price, especially on the domestic sizes.


MINIMUM ST. LOUIS PRICES ON STANDARD 2-INCH COAL, SEASON 1913-14 AND 1914-15
SEASON 1913-1914
DOLLARS
1.40
1.30
1.20
1.10
1.00
0.90
0.80
4 18 1 15 29 12 26 10 24 7 21 5 19 2 16 30 13 27 13 27 10 24 8 22 5 19
JULY AUG SEPT. OCT NOV. DEC. JAN. FEB. MAR. APR. MAY JUNE
COAL AGE.

Anthracite is still slow, with very little moving, and the same applies to coke. Smokeless is unusually dull, with plenty under demurrage at East St. Louis, and anthracite is the same. Prospects are, however, that the middle of the month will see a better movement of everything.

The prevailing prices are:

	Williamson and Franklin Co.	Big Muddy	Mt. Olive	Standard	Sparta
2-in. lump	.....	....	$1.15	$0.85	$0.95
3-in. lump	.....	....	.....	.....	.....
6-in. lump	$1.15@ 1.35	....	1.25	1.00	1.15
Lump and egg	1.85@ 2.15	$2.00	.....	....	1.15
No. 1 nut	1.15@ 1.30	....	.....	.....	.....
Screenings	0.85@ 0.90	....	0.80@0.85	0.75	0.75@0.80
Mine-run	1.00@ 1.15	.....	.....	0.75@0.80	.....
No. 1 washed nut	1.30@ 1.40	2.25	1.50	....	.....
No. 2 washed nut	1.20@ 1.30	....	1.35	....	.....
No. 3 washed nut	1.15@ 1.25	....	.....	....	.....
No. 4 washed nut	1.15@ 1.25	....	.....	....	.....
No. 5 washed nut	0.70@ 0.85	....	.....	....	.....

KANSAS CITY

Harvesting demand about satisfied. Shortage in the supply of fuel oil will create an increased consumption of coal.

Future bookings have continued to measure above those for the corresponding period a year ago. Most of the mines in this section are running about four days a week, with some operating even more fully. Much of the demand created by the wheat harvest in Kansas and other states has ceased, though some shipping will be done until August.

A feature of developments of the past week was the announcement by the Standard Oil Co. that it will be unable to supply big consumers of fuel oil after Oct. 1. This means that the industrial concerns which have relied on oil will necessarily install coal burning equipment. Consumption will be heavier during the coming fall than ever before, according to present indications.

PORTLAND, ORE.

Market featureless, with very little business transacted.

This is the time of year when there is little doing here in the fuel trade, and this year is no exception to the rule. The warm weather keeps the consumer's thoughts from the coal bin and little is being bought now for storage, although the summer rates have gone into effect. Most of the mines in the Pacific Northwest are working slow, many of them operating enough only to supply regular customers, such as the railroads and manufacturing industries.

PRODUCTION AND TRANSPORTATION STATISTICS

BITUMINOUS COAL MOVEMENT

The following is a summary of the movement of coal and coke over 13 principal railroads during April and the first four months of the last two years, in short tons:

	April		4 Months	
Anthracite	1913	1914	1913	1914
Baltimore & Ohio[1]	123,602	129,220	557,994	536,762
Chesapeake & Ohio[1]	2,176	1,903	4,343	4,954
Erie[3]	753,072	726,237	2,711,120	2,854,845
Pennsylvania[1 3]	930,592	1,070,562	3,674,096	3,776,953
Virginia[2 1]	45	.....	356	102
Total 5 roads	1,809,487	1,927,922	6,947,909	7,173,616
Bituminous				
Baltimore & Ohio[1]	2,660,702	2,275,296	11,191,886	11,228,213
Buffalo, Roch. & P.[1 2]	661,519	347,260	2,955,146	2,842,680
Buffalo & Susq.[1 2]	152,537	14,721	602,601	447,647
Chesapeake & Ohio[1]	964,104	1,637,214	4,925,334	6,028,035
Erie[3]	70,970	218	255,822	28,421
Hunt. & Br'd T. Mt[1 2]	93,376	77,219	474,976	407,176
New York Central	675,175	333,222	3,119,160	2,825,987
Norfolk & Western[1 2]	1,543,220	2,117,286	7,237,796	7,861,693
Pennsylvania[1 3]	3,796,432	3,699,928	15,914,179	16,114,420
Pitts. & Lake Erie[1 2]	1,133,744	434,399	4,043,395	3,525,221
Pitts. Shaw. & North[1 2]	227,003	72,747	908,985	864,002
Virginia[1 2]	345,039	342,843	1,578,283	1,346,660
Western Maryland	245,564	237,031	1,006,549	988,076
Total 13 roads	12,569,385	11,589,384	54,214,112	54,508,231
Coke				
Baltimore & Ohio[1]	400,317	343,962	1,616,068	1,240,461
Buffalo, Roch. & P.[1 2]	45,436	17,523	209,443	97,222
Buffalo & Susq.[1 2]	26,448	10,007	104,211	120,866
Chesapeake & Ohio[1]	28,471	36,215	121,085	147,323
New York Central	7,723	.....	25,152	.....
Norfolk & Western[1 2]	129,625	86,918	578,453	404,602
Pennsylvania[1 3]	1,230,979	916,369	4,987,304	3,616,606
Pitts. & Lake Erie[1 2]	594,863	529,535	2,454,710	1,870,674
Pitts. Shaw & North[1 2]	91	.....	9,383	.....
Western Maryland	7,865	5,308	26,903	29,446
Total 10 roads	2,471,818	1,945,837	10,132,712	7,527,200

Total Coal and Coke, 13 Roads	1913	1914
January	19,266,202	18,124,936
February	17,546,496	15,419,489
March	17,631,345	20,201,479
April	16,850,690	15,463,143
Total, 4 months	71,294,733	69,209,047

[1] Includes coal from connecting lines.
[2] Includes company's coal.
[3] Does not include company's coal hauled free.

Note:—The Southern Railway hauled 339,126 short tons of bituminous coal during March, and 987,968 short tons during the three months.

SOUTHWESTERN TONNAGE

The following is a comparative statement of the Southwestern tonnage for January of the years 1913 and 1914:

State	1912	1913	Increase	Decrease
Missouri	305,825	277,609		28,216
Kansas	523,605	526,300	2,695	
Arkansas	183,648	162,056		21,592
Oklahoma	366,859	333,125		33,734
Totals	1,379,937	1,299,090	2,695	83,542

This statement only covers the tonnage of members of the association, which is estimated to be at least 95% of the entire production.

ANTHRACITE SHIPMENTS

Anthracite shipments for June and the first six months of the current year as compared with last year were as follows:

	June		6 Months	
	1914	1913	1914	1913
Phila. & Reading	944,816	1,155,107	6,031,648	6,858,384
Lehigh Valley	1,325,982	1,183,821	6,155,075	6,592,131
Cent. R.R. N.J.	839,514	851,445	4,389,087	4,575,664
Del. Lack. & West.	941,868	827,714	4,598,506	4,789,360
Del. & Hudson	661,248	568,352	3,415,875	3,504,539
Pennsylvania	470,652	510,341	3,217,088	3,167,106
Erie	738,175	661,892	3,990,027	4,079,792
Ont. & Western	207,931	211,375	1,148,483	1,284,878
Total	6,130,186	5,970,047	32,945,789	34,851,854

SAULT STE. MARIE CANALS

Coal shipments through the Sault Ste. Marie Canals for June of the current year were as follows in short tons:

	U. S. Canal	Cana. Canal	Total
Anthracite	344,989	69,412	414,401
Bituminous	1,512,894	333,795	1,846,689

FOREIGN MARKETS

GREAT BRITAIN

June 26—There is very little doing on account of the British Marine Engineers' strike. Spot supplies are obtainable at comparatively cheap figures, but sellers are holding for high prices for forward deliveries.

Approximate quotations:

Best Welsh steam	$5.04@5.28	Best Monmouthshires	$4.08@4.14
Best seconds	4.68@4.80	Seconds	3.84@3.90
Seconds	4.44@4.56	Best Cardiff smalls	2.58@2.64
Best dry coals	4.32@4.50	Seconds	2.46@2.52

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those of Monmouthshire descriptions are net f.o.b. Newport; both exclusive of wharfage, and for cash in 30 days.

Coke is quoted at: Special foundry, $6.24; good foundry, $4.80@5.52; furnace, $4.08@4.56.

SPAIN

Spanish imports for the three months to Mar. 31 in metric tons were:

	1913	1914
Coal	640,958	695,293
Coke	91,387	91,525

RUSSIA

The following shows the output of coal in the various districts during 1912 and 1913:

District	Millions of poods*	
	1912	1913
Donetz coal	1086.58	1268.34
Donetz anthracite	2[illegible].98	292.61
Dombrowa (Poland)	394.53	426.31
Ural	47.50	60.16
Moscow	12.93	17.12
Caucasus	4.27	4.27
Total	1763.79	2068.81

The above corresponds to an increase of 17.3 per cent.
*1 ton = 62.028 poods.

French Coal Imports at Rouen—All records for imports of coal were exceeded in 1913 with a total of 3,174,818 tons against 2,488,687 tons in 1912, the increase being almost exclusively due to shipments from Great Britain which furnishes nearly all of this article. Imports of anthracite were 250,438 tons. Total imports of German coal in 1913 were 149,525 tons. The excellent equipment at Rouen for loading and unloading coal is thought to be partly responsible for the route being so largely used to reach interior France, facilities of the port permitting the discharge of 3300 tons of coal in 9 hr. Four-fifths of the coal imported into Rouen by sea is reshipped to interior France. Less than a third is forwarded by railroad; of the remainder, delivered in barges, Paris and ports on the Seine receive most, but barges from Rouen bearing English coal go far beyond. In western France they deliver cargoes at Alencon, Mans and Tours to compete against the importations of coal from an opposite direction; by the network of waterways in central France they reach Montargis and Dijon, and by the system of canals of the Oise, the Aisne, and the Marne this water-borne coal arrives to compete against France's own coal mines in the markets of Amiens, Soissons and Nancy; anthracite ascends to the industrial centers of the Vosges, the Meuse and the Haute Marne, to be utilized at gas plants.

Financial Department

Pittsburgh Coal Co.

M. H. Taylor, chairman of the board of Pittsburgh Coal Co., says in his report for 1913:

Production—The total tonnage produced and handled for the year, including coke, and exclusive of coal purchased and handled by the dock companies was 24,707,204 net tons, an increase over 1912 of 644,822, or 2.68%.

While 1913 began with large stocks and a lessened demand, due to weather and trade conditions, an early improvement in the latter permitted all of the mines to average fairly full operating time until the last quarter of the year, when, influenced by free shipments made from all fields and by the recession in general business which then set in and continued for the balance of the year, demand fell off, with the result that the tonnage increase shown on the nine months to Oct. 1 of 6.58% was reduced to 2.68% for the whole year. Transportation facilities were good and efficient, and under no unusual shortage on labor or labor troubles, the output for the year would have largely exceeded 1912 through ability to produce and handle, could it have been placed.

Earnings—An increase of 35% in net earnings for the year on 2.68% tonnage increase—indicates the application of efficiency to the different plants in sales, production, handling and distribution; and especially, that all producers have been forced by their necessities to obtain a price which would more nearly represent the expense, risk and value of their product. By reason of the vast general production of the country, always increasing, its accompanying wastes and higher costs with a decreasing labor supply, prices must continue to advance until there is a substantial reduction in the present heavy percentage of labor charge by mechanical development. A better selling value is required to improve living conditions, to reduce personal injury risk, for proper compensation when sustained, and to secure a larger recovery of the coal.

Bonds—No new bond obligations have been assumed since last annual report and there has been retired during the year in principal of bonds and mortgages the sum of $1,965,243, of which $1,720,243 was paid out of working capital, and $245,000 from bond sales proceeds under Pittsburgh Coal, Dock & Wharf Co. mortgage of Apr. 1, 1912, reserved for the purpose. The principal of total bonded and mortgage debt, direct and indirect, at the end of year, was $31,154,255.

Improvements—It is realized that efficiency in selling, mining and distributing the output must always be had to obtain best general results against competition to be met, and to this end the large investments have been made during the past five years at mines, docks and yards. Some of the results for 1913 come from these investments for modern facilities, and each year should increase their service. Dock No. 5, West Superior, Wis., has been completed, and its operating results are fully up to expectations, as also those of Dock No. 7, Duluth, Minn., continue to be. Lime Island dock went into operation Aug. 30, 1913. Further construction should be added to No. 5 dock, and also to Algonquin dock at Sault Ste. Marie, Mich., when the company is in position to do so. Maintenance and operation of each unit have been directed to promote "safety first."

There is no floating debt other than current obligations for operating and maintenance, except for special construction work, the cost of which has been provided for by reserved bond sales' proceeds, and usual notes issued by subsidiary companies for coal in stock.

Minor troubles, general labor shortage amounting in the average to 15% through the busy season, compliance with safety provisions required by law, unusually heavy personal injury payments, and average higher prices for supplies, have increased production cost at the mines.

The past year practically completed the change from air and steam to electric power, either made or purchased, which, with standardizing equipment at the mines, has been a heavy past charge to operation.

To maintain effective production, three new mining plants are now in course of construction on the line of the extension of the Montour R.R., and are expected to come into operation during the present year.

Coal Reserves—At the end of the year there were owned and held 150,516 acres of the Pittsburgh vein. Should there be no greater annual exhaustion than during 1913, and no further acreage be hereafter acquired, that now owned will continue the life of the company for about 54 years, as a whole, with the other veins in reserve.

Preferred Dividends—It has been a regret to your directors that discharging debts and building up the physical structure of the company has so far deferred any adjustment of the dividend arrearage upon the preferred stock, amounting to 40.58¾%, as of Dec. 31, 1913.

Due to its present physical and financial condition, its trade position, and a belief in its ability to maintain earnings up to an average better than the past under like opportunities, your directors have felt for some time that they would be warranted in taking the matter into considertaion, in the hope that some adjustment plan might be found that the company could undertake and be acceptable to the shareholders; and, therefore, a committee of the board has been named to first consider and advise what plan or course, in its judgment, could be recommended, but action by it has been delayed on account of the continuing unsettled business situation, and will be until improvement in it permits.

Forecast—A conservative expectation of results for the year is warranted, based on tonnage movement so far, consequent increase in production cost and uncertainty of trade requirements, although there has come a more general feeling of encouragement for the future, with some improvement in demand. Production cannot reach the total of 1913 on the present level of general business, nor become active again until its excess now carried in stock has been used. Both cost and selling value are involved in the renewal of the biennial wage agreement which expires Apr. 1, not yet arranged. Full trade requirements of the company will be maintained and can be met, after possible interruption of running time for these causes to some extent, by the reserve capacity of the plants and handling facilities which the company now has, with labor and transportation supply.

Results for Calendar Year

(Including Monongahela River Consol. Coal & Coke Co. in 1913)

*Produc. (tons 2,000 lb.)	1913	1912	1911	1910
Pittsburgh district coal	23,451,623	16,948,775	14,739,158	16,213,912
Hocking district coal	1,072,873	1,414,642	1,281,517	1,267,914
Kentucky district	182,708	.....	.....	.....
Profits, after all expenses	$6,421,703	$4,427,063	$4,044,504	$4,699,863
S. fs., & depl. coal lands	1,555,089	714,306	696,181	777,285
Deprec. plant and equip	1,284,206	811,251	867,595	901,089
Net profits	$3,582,408	$2,901,506	$2,480,728	$3,021,489
Interest on bonds	$856,140	$876,024	$1,088,791	$1,056,039
Preferred dividend (5%)	1,353,590	1,353,590	1,353,590	1,353,590
Undivided profits	$1,372,678	$671,892	$38,347	$611,860
Surplus brought forward	9,153,434	8,481,541	8,443,194	7,831,333
Total surplus Dec. 31	$10,526,112	$9,153,434	$8,481,541	$8,443,193

*Production includes sundry purchases from other producers and coal used in manufacture of coke.

Earnings in 1913 and 1912

(Including Monongahela River Consol. Coal & Coke Co. in Both Years)

	1913	1912	Deducn's (Con.)—	1913	1912
Gross receipts	$36,266,146	$34,420,720	Res.for bond prem.	$520,128	$483,462
Earnings	6,421,703	5,692,429	Bond interest	856,139	876,024
Deduct—			Pref. divs. (5%)	1,353,590	1,353,590
sink. fd.	1,034,961	921,345	Balance, surplus	1,372,679	671,893
Depr. plants & eq.	1,284,206	1,386,115			

Consolidated Balance Sheet December 31

(Pittsb. Coal Co. and Sub. Cos., incl. Monongahela River Cons. Coal & Coke Co.)

Assets—	1913	1912	Liabilities—	1913	1912
Properties	$81,815,016	$79,826,702	preferred stock	$32,000,000	$32,000,000
Treasury stock—			Common stock	32,000,000	32,000,000
Pref. stock	4,928,200	4,928,200	First M. bds.		
Investm'ts in stks. and bo.	2,415,020	2,975,026	(see Ry. & Ind. Sec.)	30,147,500	29,049,000
Cash with trustees	10,880,223	10,149,893	Mtgs. payable	250,755	315,498
Pension fund investments	110,206	86,243	Ctfs. of indebt.	600,000	745,000
Merchandise	7,132,057	5,619,625	Car trust notes	156,000	260,000
Accounts and bills receivable	6,798362	7,905,937	Pension fund	125,533	108,026
Cash	2,217,362	2,349,949	Bills payable	4,053,680	2,875,255
			Accts. payable	4,061,741	5,307,661
			Stock purch. sur.	1,021,992	1,021,992
			Insurance fund	356,859	412,294
			Sales conting. fund	25,000	25,000
			Bond prem. res've	971,274	568,415
			Undivided earns	10,526,112	9,153,434
Total	116,296,446	113,841,575	Total	116,296,446	113,841,575

*Properties owned Dec. 31, 1913, consisting of coal lands, mine plants and equipment, railways, railway cars, docks on Great Lakes, etc., were: Coal lands and real estate, less allowance for depletion of coal lands $61,700,387; plants and equipment, less depr., $20,114,629.